

[54] **STINGER LATCHING APPARATUS**

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[51] Int. Cl.<sup>2</sup> .... **B63B 35/04; E05D 1/06**

[58] Field of Search..... **61/72.3, 72.1, 46.5; 16/171, 172; 14/71, 27; 114/5 F**

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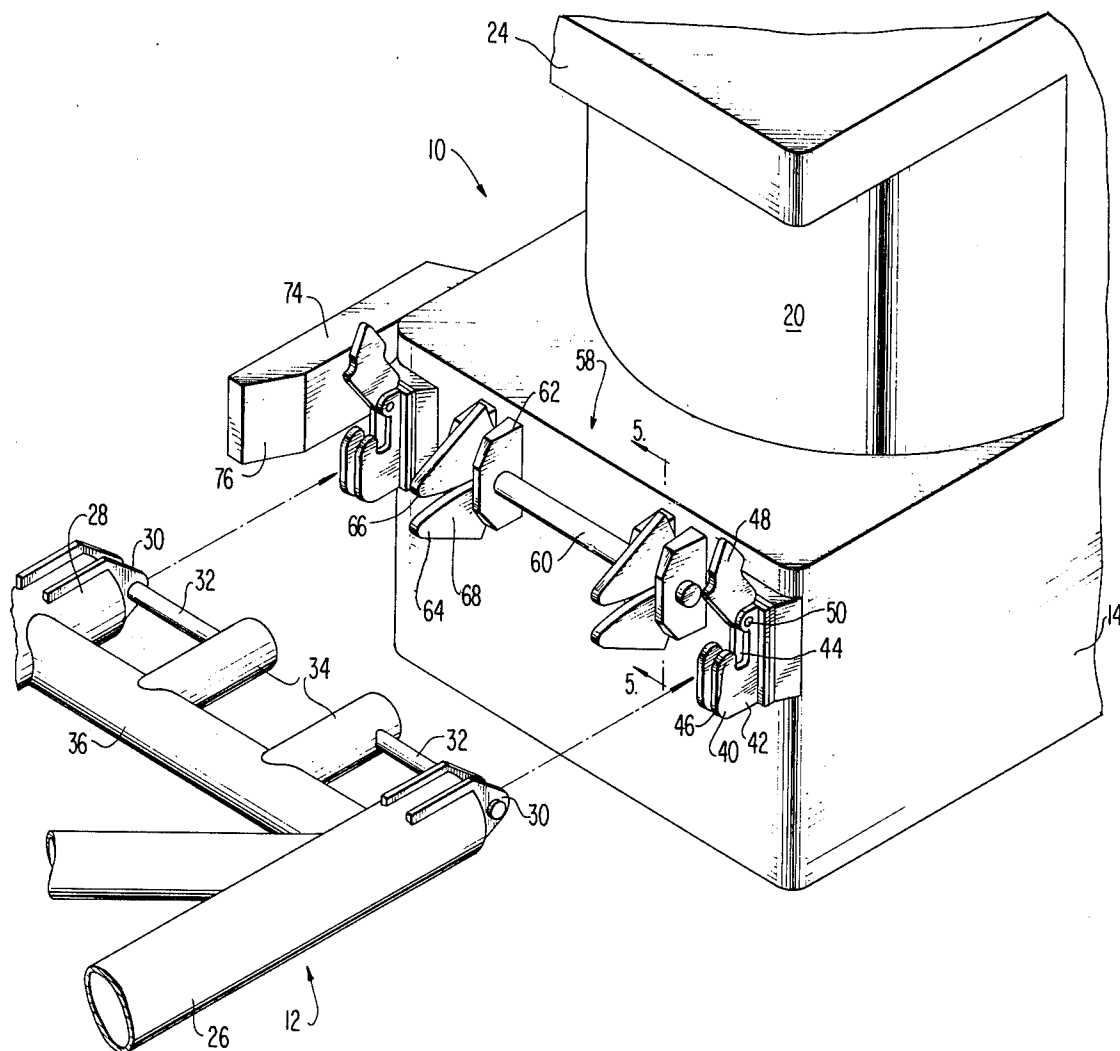
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[57] **ABSTRACT**

Disclosed is a latching apparatus secured to the stern of a pipelaying barge and including a pair of laterally spaced barge latches defining slots for receiving laterally disposed pins carried by the forward end of a stinger. Intermediate the barge latches are a pair of laterally spaced receiver forks hinged to the stern of the pipelaying barge and coupled one to the other by a torsion shaft. The receiver forks define guide passages for guiding the pins of the stinger into the slots of the barge latches as the stinger is displaced forwardly into latching engagement with the barge. The receiver forks, through the torsion shaft, enable both stinger latch pins to substantially simultaneously latch and unlatch relative to the barge stern.

**37 Claims, 8 Drawing Figures**



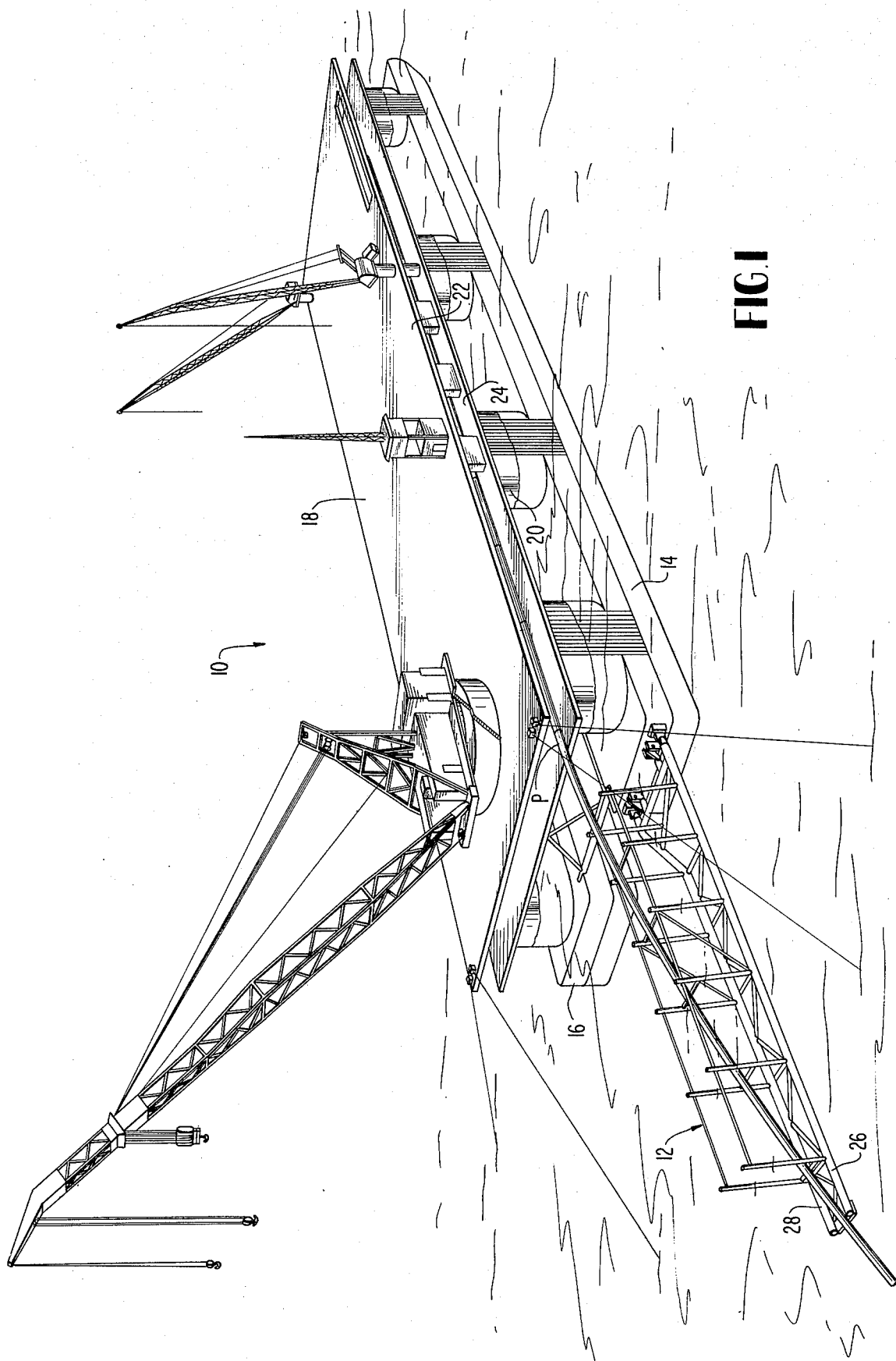


FIG. 2

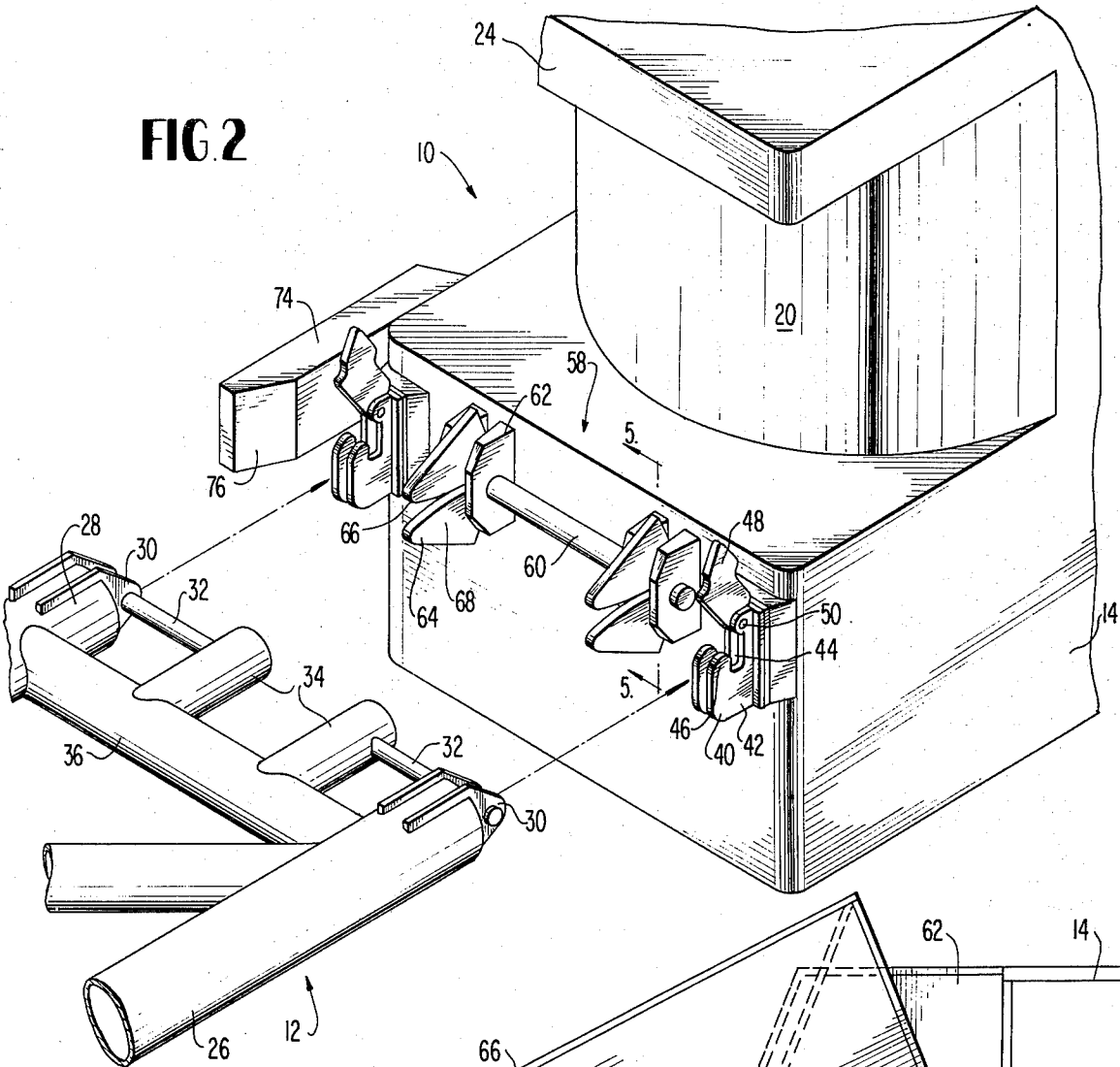
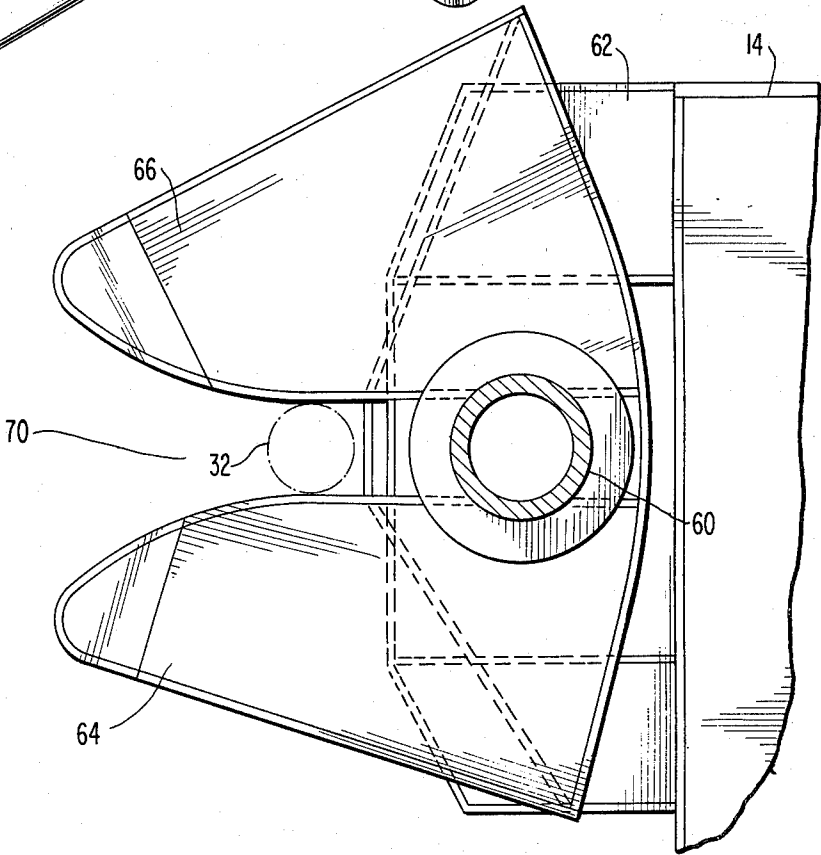
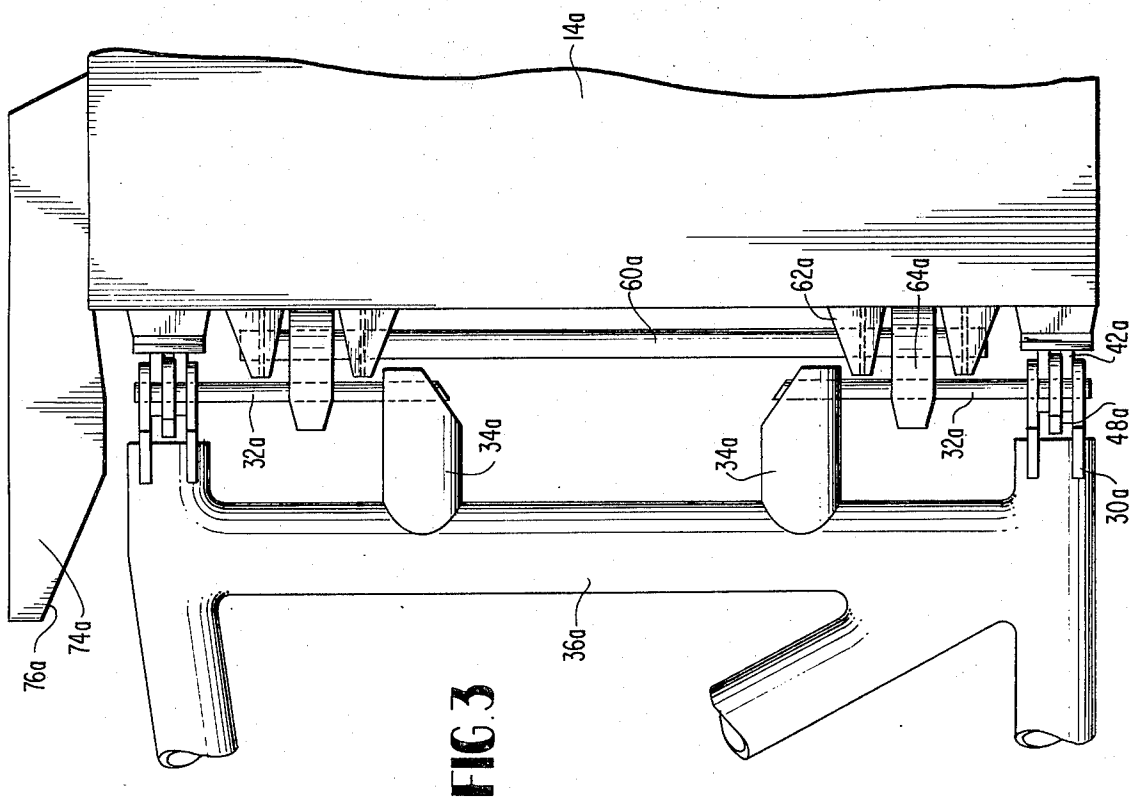
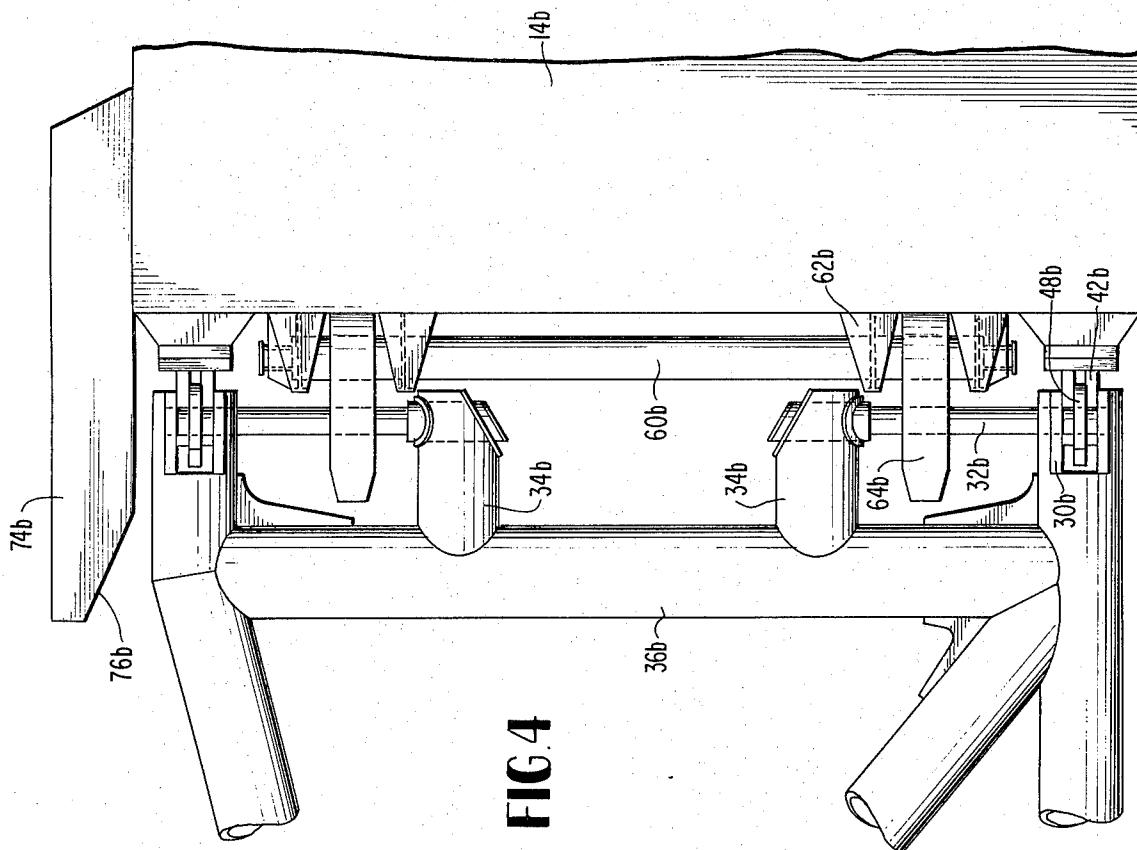
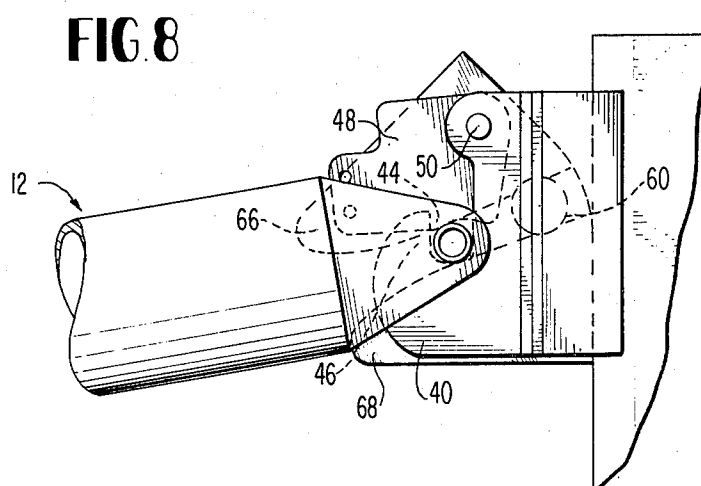
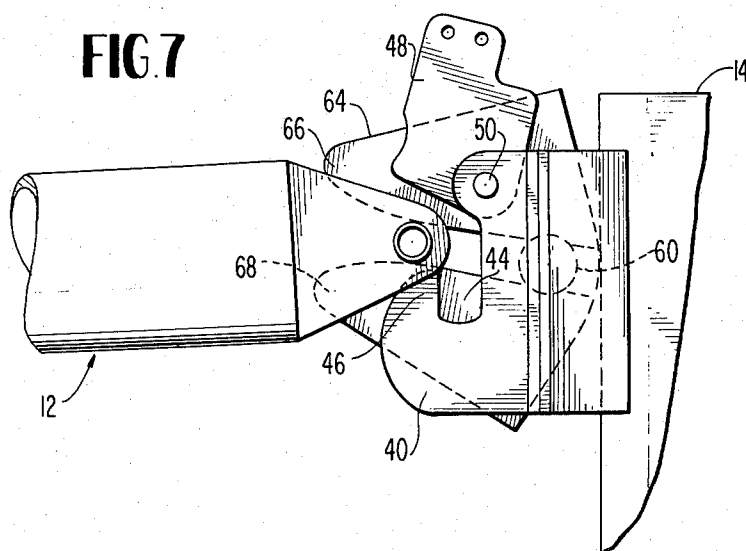
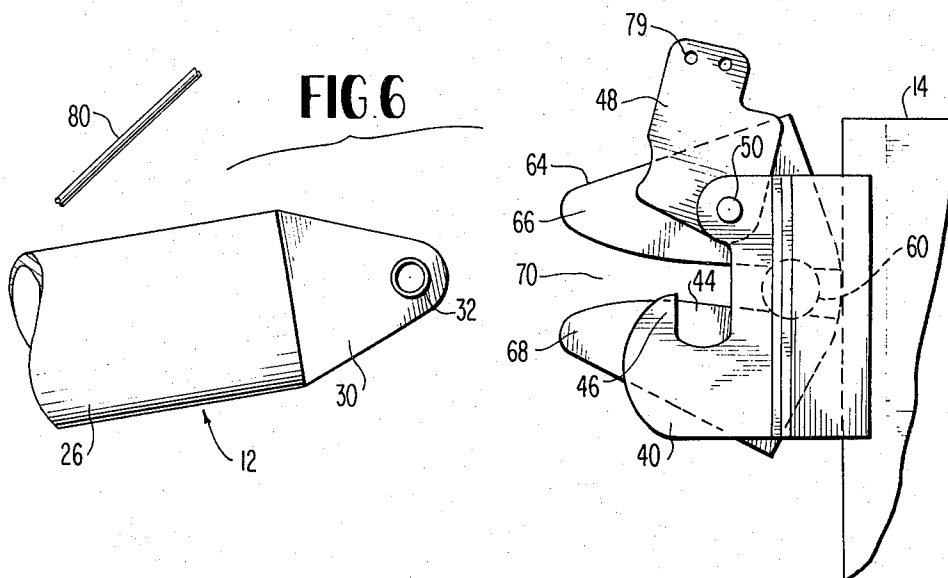


FIG. 5







## STINGER LATCHING APPARATUS

The present invention relates generally to apparatus for laying underwater pipelines and particularly for coupling a stinger to the stern of a pipelaying barge. More particularly, the present invention relates to latching apparatus for guiding the stinger latch pins into and out of connection with the barge latches.

In laying pipeline offshore, it is conventional practice to utilize a stinger to support the pipeline for a limited distance through the air and water as the barge advances and the pipeline is payed out from the aft end of the barge. Many and various types of stinger constructions have been proposed and constructed. For example, an articulated stinger arrangement is disclosed in U.S. Pat. No. 3,438,213 specifically for use with a conventional pipelaying barge. Another type of stinger specifically configured for use with a semisubmersible column stabilized pipelaying barge is disclosed in U.S. Pat. No. 3,685,305 of common assignee herewith. The stingers used for both the conventional pipelaying barge and the semisubmersible column stabilized pipelaying barge are both preferably releasably attached to the stern of the barge. For example, in pipelaying operations, it is common practice for the stinger to be carried by another vessel to the work site whereupon the stinger is lowered into the water and coupled to the stern of the pipelaying barge. Likewise, at the end of the pipelaying operation, the stinger is detached from the barge and is lifted aboard such other vessel for transportation to a new work site. Also, during pipelaying operations, it is not uncommon for the stinger to be released from the barge during heavy seas when pipelaying operations cannot be conducted and thereafter recovered for reattachment with the barge and the continuance of pipelaying operations. Consequently, during a particular pipelaying operation, the stinger may be attached to and detached from the pipelaying barge a number of times.

Great difficulties are attendant to these attaching and detaching operations even in calm waters and such difficulties are magnified and increased in heavier seas. For example, and with reference to U.S. Pat. No. 3,685,305 the stinger is attached to the barge by the engagement of a pair of laterally spaced latching pins with a pair of laterally spaced barge latches mounted at the stern of the barge. Particularly, lines are connected to the stinger and the stinger is hauled in toward the stern of the barge. Experience has shown that this connection can be effected quickly or take up to a full day's time depending upon the skill of the operators and the existent sea state. That is, the insertion of the latch pins carried by the stinger into the slots carried by the barge latches has been heretofore a random or hit or miss proposition with a principal part of the difficulty residing in the necessity to engage both latch pins in the barge latches substantially simultaneously. If only one latch pin engages the barge latch and not the other, structural damage to the stinger and/or the stern of the barge is likely to occur. With the high daily operating costs of such pipelaying barges and the consequent delay occasioned by the attachment and detachment of the stinger relative to the barge, there has arisen the need for latching apparatus which would render the connection and disconnection of the stinger relative to the barge both relatively quick and simple thereby eliminating barge down-time and reducing the costs of the pipelaying operation.

The present invention provides a latching apparatus for stingers which minimizes or eliminates the foregoing noted and other disadvantages of prior latching devices between stingers and pipelaying barges and provides a novel and improved latching apparatus therefor having various advantages in construction, mode of operation and result in comparison with such prior latching apparatus. Particularly, the present invention provides a latching apparatus which guides the latch pins of the stinger into latching position during latching operations and furthermore ensures substantially simultaneous latching of both stinger latch pins with the barge latches whereby structural damage due to latching one and not the other latch is avoided. Specifically, the latching apparatus of the present invention includes a pair of laterally spaced barge latches defining slots for receiving transversely extending latch pins mounted at the forward end of the stinger in combination with a device for guiding the latch pins and hence movement of the forward end of the stinger such that the latch pins on the stinger are substantially simultaneously guided into or removed from the barge latch slots. The barge latches define slots each of which extends downwardly from a rearwardly opening entrance thereto whereby the stinger latch pins must be displaced over the rear-most or keeper portions of the latches and down into the slots. The guide forks are pivotally coupled to the stern of the barge and coupled to one another by a torsion shaft which assures joint pivotal movement. Each fork includes an outwardly diverging opening for receiving a stinger latch pin.

In using the latching apparatus to latch the stinger to the stern of the barge, the stinger is drawn toward the barge by lines attached to the stinger and to winches on the barge. The latch pins are disposed within the entrance openings of the guide slots in the guide forks. Continued hauling in on the lines coupled to the stinger causes the guide forks to jointly pivot upwardly with the latch pins in the forks being displaced slightly upwardly and forwardly. The torsion shaft ensures that the guide forks pivot jointly preventing the latching of one latch pin and not the other. When the latch pins are received within the barge latch slots, ears pivoted to the barge latches are swung downwardly to maintain the pins within the slots. During the latching operation, a lateral guide is provided along one side of the barge to assist in laterally aligning the stinger relative to the barge. To unlatch the stinger from the barge, the locking ears on the barge latches are pivoted to an open position and the forward portion of the stinger is elevated slightly relative to the barge. The latch pins are substantially simultaneously aligned with the entrance openings of the barge latch slots and the passages along the slots of the guide forks whereby the latch pins can slip rearwardly along and out of the guide fork slots past the keepers.

Accordingly, it is a primary object of the present invention to provide a novel and improved latching apparatus for connecting and disconnecting stingers from pipelaying barges.

It is another object of the present invention to provide a novel and improved latching method which facilitates the connection and disconnection of a stinger and a pipelaying barge.

It is still another object of the present invention to provide a novel and improved latching apparatus for stingers wherein the stinger can be expeditiously connected to and disconnected from the barge and with

3

complete avoidance of structural damage to the pipelaying barge and/or stinger.

It is a further object of the present invention to provide a novel and improved latching apparatus for stingers wherein the stinger latch pins are guided into and out of latching position.

These and further objects and advantages of the present invention will become more apparent upon reference to the following specification, appended claims and drawings wherein:

FIG. 1 is a perspective view of a pipelaying vessel and a stinger connected to the pipelaying vessel by latching apparatus constructed in accordance with the present invention;

FIG. 2 is an enlarged fragmentary perspective view of the latching apparatus carried at the forward end of the stinger and the stern of the pipelaying vessel;

FIG. 3 is a fragmentary plan view of the latching apparatus between the stinger and the stern of the pipelaying vessel hereof;

FIG. 4 is a view similar to FIG. 3, illustrating another form thereof;

FIG. 5 is an enlarged cross sectional view of the latching apparatus hereof taken generally about on line 5-5 in FIG. 2; and

FIGS. 6, 7 and 8 are fragmentary side elevational views of the latching apparatus hereof and illustrating the sequence utilized in connecting the stinger to the pipelaying barge.

Referring now to the drawings, particularly to FIG. 1, there is illustrated an offshore pipelaying system including a pipelaying barge generally designated 10 and a stinger generally designated 12 coupled to the stern of the pipelaying barge and adapted to support the portion of a pipeline p payed out from the barge which extends through the air and the portion of the pipeline which initially extends into the water. The pipelaying vessel 10 may comprise a conventional pipelaying barge, for example a barge of the single hull type, or may comprise as illustrated in FIG. 1 a column stabilized semisubmersible type pipelaying barge. An example of this latter type of barge is disclosed in U.S. Pat. No. 3,835,800 dated Sept. 17, 1974, of common assignee herewith, the disclosure of which patent is incorporated herein by reference thereto as though fully set forth herein. Briefly, the pipelaying barge 10 illustrated in FIG. 1 includes a pair of laterally spaced lower hulls 14 and 16 and a platform 18 spaced above the hulls and supported from the hulls by a plurality of longitudinally spaced columns 20 which upstand from each of the hulls 14 and 16. Platform 18 includes a pair of decks 22 and 24 and, in the illustrated form, pipelaying apparatus including but not limited to a pipe transfer and lineup station, a plural number of pipe welding stations, pipe tensioning and traction stations, and coating and inspection stations are provided serially along deck 24. In this illustrated form, pipe sections are joined one to the other and the pipeline is payed out from the vessel along one side thereof although it will be appreciated that the pipeline can be formed and payed out substantially along the vessel's centerline as described and illustrated in U.S. Pat. No. 3,685,305 dated Aug. 22, 1972 also of common assignee herewith.

Stinger 12 may be of the type described and illustrated in U.S. Pat. No. 3,685,305, above mentioned, and also U.S. Pat. No. 3,704,596, the latter patent also being of common assignee herewith, the disclosure of which patents are incorporated herein by reference

4

thereto as though fully set forth herein. It will be appreciated, however, that the term "stinger" is not limited to the structures disclosed herein or in the two U.S. Patents noted above but encompasses any type of floatable structure useful to support pipeline as it is payed out from the pipelaying vessel. Generally, the illustrated stinger 12 comprises a floatable body having upstanding supports at longitudinally and transversely spaced positions therealong which straddle and support the pipeline P payed out from the pipelaying barge 10. More particularly, the pipeline P is supported as it is payed out from the stern of pipelaying vessel 10 for the full distance which the pipeline extends through the air to the waterline and also for a discrete distance which the pipeline extends into the water. The body of stinger 12, in the illustrated form, may comprise a pair of longitudinally extending laterally spaced pontoons 26 and 28 which, adjacent the forward end of the stinger, diverge one from the other and carry connections for releasably connecting the stinger to the stern of the pipelaying barge. As noted previously, the stinger 12 may be carried by another vessel or by the pipelaying barge 10 to the pipelaying site and disposed in the water for connection to the stern of the pipelaying barge 10. This connection is usually accomplished by lines disposed about the stinger and connected to winches carried by the barge whereby the stinger can be drawn up to the stern of the pipe-laying barge and connected thereto. Also, as noted previously, the stinger may be released from the barge at the end of the pipelaying operation and also during extreme weather conditions to avoid structural damage to the stinger and/or pipelaying barge. Consequently the expeditious and quick connection and disconnection of the stinger from the pipelaying barge is a desirable characteristic of a pipelaying system and the following comprises a detailed description of such apparatus.

Referring now to FIG. 2, there is illustrated the forward end of the stinger 12 with the tubular pontoons 26 and 28 each terminating in a pair of transversely spaced forwardly extending plates or lugs 30. A latching pin 32 is received through each of aligned apertures in lugs 30 on each side of stinger 12. The latch pins 32 extend transversely inwardly for connection with a pair of transversely spaced forwardly extending support elements 34 connected to a transverse strut 36 which interconnects the tubular bodies 26 and 28.

At the stern of the pipelaying barge 10, there is provided a pair of transversely spaced identical barge latches designated 40 secured to the stern of one of the hulls of the pipelaying barge by structural interconnections not shown. Each latch 40 includes a pair of transversely spaced plates 42, each of which plates is provided with a slot 44 for receiving the latch pin 32 of stinger 12. The slots 44 of the plates lie in transverse alignment each with the other and open upwardly and in an aft direction. Such slots 44 are also in part defined by keepers 46 which extend upwardly from base portions of the plates. Each latch includes a locking ear 48 which is pivoted about a pin 50 connected between the upper extremities of plates 42 for swinging movement in a vertical plane into positions between plates 42. It will be appreciated that locking ear 42 is thus pivotal between positions opening slots 44 as illustrated in FIG. 2 and positions closing the latching pins 32 in the slots as illustrated in FIG. 9 in a manner to be described hereinafter.

5

As illustrated in FIG. 2, there is disposed between the transversely spaced barge latches 40 a barge latching guide apparatus generally designated 58. Generally, the latching guide apparatus 58 includes a torsion bar 60 pivotally received at each of its opposite ends in a pair of transversely spaced support elements 62 structurally connected to hull 14. Between each support element 62 at each of the opposite ends of the torsion bar 60 and rigidly secured to the torsion bar 60 is a receiver fork 64. Each receiver fork 64 is bifurcated to include upper and lower guides 66 and 68 which define a generally horizontally extending slot 70 therebetween. The slot 70 between guides 64 and 66 extends in a generally horizontal direction and opens in an aft direction. The walls of guides 64 and 66 which define slot 70 diverge one from the other in an aft direction to define a large entrance opening to slot 70 to facilitate reception of the latching pins in the slot 70 of the receiver forks 64 as explained below. The slots 70 of receiver forks 64 lie in transverse registry one with the other and the torsion bar 60 connected between the receiver forks 64 ensures joint pivotal movement of the forks 64 relative to the barge.

In the preferred form of the present invention, a horizontal guide 74 is provided on one side of the hull to which the stinger is attached, preferably the inboard side thereof, and projects rearwardly beyond the stern portion of the hull 14. The guide includes a tapered surface 76 and assists in horizontally aligning the stinger for connection with the barge.

Referring now to FIGS. 3 and 4, two distinct embodiments of the present invention are illustrated and like numerals refer to like parts as previously described with the letter suffixes a and b denoting such parts in the embodiments of FIGS. 3 and 4, respectively. These embodiments are virtually identical in function and operation and differ in slight structural details only. The differences in the embodiments illustrated in FIG. 3 and 4 therefore comprise minor details in construction and dimension and such details are not believed sufficiently important to warrant full description thereof.

Referring now to FIGS. 6-8, the latching and unlatching operation wherein stinger 12 can be readily connected to and detached from the stern of the pipelaying barge will now be described. Referring to FIG. 6, the forward end of stinger 12 is illustrated longitudinally spaced from the barge latching apparatus 40. It will be appreciated that lines designated 80 are attached to the stinger and are hauled in by winches mounted on the barge to draw the stinger forwardly toward the stern of the barge. It will also be appreciated that as the stinger is drawn forwardly, the motions of the stinger and barge are most likely mismatched whereby the stinger cannot be simply drawn forwardly and the latch pins 32 deposited in latch slots 44. With the divergence of the walls of guide forks 66 and 68 at the entrance to the slots 70 in the receiver guide forks 64, however, it is a relatively simple matter for the stinger to be drawn forwardly to engage latch pins 32 in the entrance openings of the receiver forks. For example, if the stinger and barge have slightly different angles of heel, or if the latch pins lie at different elevations than the latch slots 44, the divergent slot walls still permit guided entry of the latch pins into the slots 70. Further, the engagement of latch pins 32 in the bifurcated receiver forks 64 enables simultaneous pivoting action of the forks to ensure, as the stinger is drawn forwardly, that the latch pins lie at elevations common to the respective receiver

6

forks and to the slots 44 of the barge latches. Once the latch pins 32 are disposed in the entrance openings to slots 70 of receiver forks 64, further forward and slightly upward movement of the forward end of the stinger causes the receiver forks 64 to simultaneously pivot in a counterclockwise direction as illustrated in FIG. 7. This pivoting action of the receiver forks 64 guides the latch pins 32 upwardly over the ears 46 of the barge latches 40 and disposes latch pins 32 in the entrance openings of the slots 44 of barge latches 40. Note that as the latch pins 32 engage deeper into the guide fork slots 70, the guides 66 and 68 prevent rolling of the barge and stinger relative to one another and also relative heave motions. Once the latch pins 32 are drawn into the forward portions of slots 70 of receiver forks 64 such that they lie in vertical registry with the slots 44 of the barge latches 40, the lines 80 are relieved enabling the forward end of the stinger to shift downwardly relative to the barge such that the latch pins 32 drop into the bottom portions of the slots 44. The locking keepers 46 prevent longitudinal disengagement of the stinger and barge latches 40. Once the latch pins 32 are disposed in slots 44, each locking ear 48 of barge latch 40 is pivoted about its axis 50 to the position illustrated in FIG. 8 into engagement with the corresponding latch pin 32 to lock the latch pins within slots 44 of barge latches 40. The locking ears 48 are provided with openings 79 whereby the locking ears 48 can be retracted or pivoted upwardly from the locking position shown in FIG. 8 to the release position shown in FIGS. 6 and 7 and held in retracted positions by lines operated from the barge. The weight of the locking ears 48 is sufficient to maintain the latch pins 32 locked in the barge latches 40 during pipelaying operations.

It will be appreciated that with the foregoing construction, quick release of the stinger from the barge can also be accomplished. To effect such quick release, the locking ears 48 are raised from the locking position illustrated in FIG. 8 to the retracted position illustrated in FIGS. 6 and 7 by lines, not shown, operated from the pipelaying barge. By raising locking ears 48, the entrance openings to the barge latch slots 44 are opened and the forward end of the stinger can be elevated slightly by use of lines 80 to raise the latch pins 32 above the keepers 46 of barge latches 40. When the latch pins 32 are clear of keepers 46, the barge can be moved forwardly whereby the latch pins 32 move along the slots 70 of the receiver forks to free the stinger from the pipelaying barge. During release, the forks generally ensure that the latch pins are simultaneously guided out of slots 44 and particularly ensure that one latch pin does not hang up in one of the barge latches while the other latch pin remains free.

It will be appreciated that with the foregoing construction there is provided a guide apparatus which readily, easily and speedily facilitates the connection and disconnection of a stinger and a pipelaying barge. This is accomplished, moreover, without structural damage to either the pipelaying barge or the stinger particularly since the torsional connection between the paired receiver forks effectively precludes the latching or unlatching of one latch pin while the other latch pin remains unlatched or latched respectively. Further, the present guide apparatus simplifies the connection and disconnection of the barge and stinger enables the foregoing particularly the connection of the stinger to the barge, to be effected in a relatively short period of time without substantial down-time and the certainty that



structural damage to the vessel or stinger will not occur.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. Apparatus for connecting a pipeline support to a pipelaying barge comprising:
  - support structure forming part of the barge;
  - a latch carried by said support structure and having a slot for receiving a connecting element carried by the pipeline support;
  - a guide pivotally carried by said support structure and having a slot for receiving the pipeline support connecting element;
  - said guide being pivotal from a first position with the guide slot in misalignment with said latch slot into a second position with said guide slot and said latch slot in registration one with the other thereby enabling guided movement of the connecting element, when received in the guide slot, into said latch slot; and
  - means carried by said support structure for releasably retaining the connecting element in said latch slot.
2. Apparatus according to claim 1 wherein said guide and said latch are transversely spaced one from the other, the guide having an entrance opening to said guide slot longitudinally spaced from the latch slot.
3. Apparatus according to claim 1 wherein said guide comprises a pair of spaced members having surfaces defining a guide slot therebetween, said guide surfaces diverging one from the other in a direction away from the pivotal axis of said guide.
4. Apparatus according to claim 1 wherein said guide and said latch are transversely spaced one from the other, said guide defining an entrance opening to said guide slot longitudinally spaced from said latch slot, the pivotal axis of said guide being longitudinally spaced from said latch slot and lying on the opposite side thereof from the entrance opening.
5. Apparatus according to claim 1 wherein said latch has a keeper in part defining said latch slot, said latch slot being elongated in a generally vertical direction with said keeper in part defining an entrance opening to said vertically elongated latch slot, said guide and said latch being transversely spaced one from the other with said guide defining an entrance opening to said guide slot longitudinally spaced from said latch slot, the pivotal axis of said guide being longitudinally spaced from said latch slot and on the opposite side thereof from the guide slot entrance opening, portions of the guide slot lying in transverse registry with said latch slot through a predetermined range of pivotal movement of said guide with said guide slot lying in transverse registry with the entrance opening to said latch slot when said guide lies in said second position.
6. Apparatus according to claim 1 including a second latch carried by said support structure and having a slot for receiving a second connecting element carried by the pipeline support, a second guide pivotally carried

by said support structure and having a slot for receiving the second pipeline support connecting element, said second guide being pivotal from a first position with the guide slot in misalignment with the second latch slot into a second position with said second guide slot and said second latch slot in registration one with the other thereby enabling guided movement of the second connecting element when received in the second guide slot into said second latch slot, and means carried by said support structure for releasably retaining the second connecting element in said second latch slot.

7. Apparatus according to claim 6 including means interconnecting the first and second guides for substantial joint pivotal movement thereof.

8. Apparatus according to claim 7 wherein said interconnecting means includes a torsion shaft connected to said guides.

9. Apparatus according to claim 8 wherein said first and second latches are transversely spaced one from the other, said first guide being transversely spaced from and located on one side of said first latch, said second guide being transversely spaced from and located on one side of said second latch, the opposite ends of said torsion shaft being connected to said first and second guides respectively.

10. Apparatus according to claim 9 wherein said first and second guides are disposed between said first and second latches.

11. Apparatus according to claim 10 wherein each of said first and second latches has a keeper in part defining the corresponding latch slot, each of said latch slots being elongated in a generally vertical direction with the corresponding keeper in part defining an entrance opening to the corresponding vertically elongated latch slot, said first and second guides defining guide slots to the respective entrance openings longitudinally spaced from the corresponding latch slot, the pivotal axes of said guides being transversely aligned one with the other with the axes being longitudinally spaced from the latch slots and on the opposite sides thereof from the guide slot entrance openings, portions of each guide slot lying in transverse registry with the corresponding latch slot through a predetermined range of pivotal movement of the guides with said guide slots lying in transverse registry with the entrance openings to said latch slots when said guides lie in said second positions.

12. Apparatus for connecting a pipeline support to a pipelaying barge comprising:

- support structure forming part of the stern of the barge;

- first and second transversely spaced latches carried by said support structure with each said latch having a slot for receiving a corresponding connecting element carried by and adjacent the forward end of the pipeline support;

- first and second transversely spaced guides pivotally carried by said support structure, said first guide having a slot for receiving the pipeline support connecting element receivable by said first latch and said second guide having a slot for receiving the pipeline support connecting element receivable by said second latch;

- said first guide being pivotal from a first position with its guide slot in misalignment with said first latch slot into a second position with its guide slot and said first latch slot in registration one with the other thereby enabling guided movement of one of the

connecting elements, when received in said first guide slot, into said first latch slot, said second guide being pivotal from a first position with its guide slot in misalignment with said second latch slot into a second position with its guide slot and said second latch slot in registration one with the other thereby enabling guided movement of the other connecting element, when received in said second guide slot, into said second latch slot; and means carried by said support structure for releasably retaining the connecting elements in said slots.

13. Apparatus according to claim 12 wherein each of said guides includes a pair of spaced members having surfaces defining a guide slot therebetween, said guide surfaces diverging one from the other in a direction away from the pivotal axis of said guide.

14. Apparatus according to claim 12 wherein each of said latches has a keeper in part defining the corresponding latch slot, each of said latch slots being elongated in a generally vertical direction with said keepers in part defining entrance openings to said vertically elongated latch slots, said guides defining entrance openings to the corresponding guide slots longitudinally spaced from said latch slots, the pivotal axes of said guides being longitudinally spaced from the corresponding latch slots and on the opposite sides thereof from the corresponding guide slot entrance opening, portions of each guide slot lying in transverse registry with the corresponding latch slot through a predetermined range of pivotal movement of the corresponding guide with each said guide slot lying in transverse registry with the entrance opening to the corresponding latch slot when the corresponding guide lies in said second position.

15. Apparatus according to claim 12 including means interconnecting said first and second guides for substantial joint pivotal movement thereof.

16. Apparatus according to claim 15 wherein said interconnecting means includes a torsion shaft.

17. Apparatus according to claim 16 wherein said first and second guides are located between said first and second latches, said torsion shaft extending transversely and having opposite end portions connected to said first and second guides respectively.

18. Apparatus according to claim 12 in combination with said pipelaying barge.

19. Apparatus according to claim 12 in combination with said pipeline support, said pipeline support including a flotation body for buoyantly supporting the pipeline support and the pipeline adapted for support thereby, the pipeline connecting elements including a pair of transversely extending latching pins.

20. Apparatus according to claim 19 in combination with said pipelaying barge, and means carried by said barge for moving the pipeline support forwardly such that said pins engage in said guide slots.

21. Marine pipelaying apparatus comprising:  
a pipelaying barge;

floatable pipeline support structure adapted to support a portion of a pipeline as it is payed out from said barge, means carried by said barge and said pipeline support for releasably securing said barge and said pipeline support one to the other including a latching element carried by one of said barge and said pipeline support and a connecting element carried by the other of said barge and said pipeline support;

a second latching element carried by one of said barge and said pipeline support and spaced transversely of the first mentioned latching element, a second connecting element carried by the other of said barge and said pipeline support and spaced transversely from the first mentioned connecting element, and means cooperable between said barge and said pipeline support for substantially simultaneously guiding said first and second latching elements and said first and second connecting elements into respective latching engagement one with the other, said first and second latching elements each having a slot for receiving said first and second connecting elements respectively, said guide means including a pair of transversely spaced guide members pivotally carried by one of said barge and said pipeline support and a pair of transversely spaced guide elements carried by the other of said barge and said pipeline support, said guide elements and said guide members being respectively engageable one with the other for guiding said first and second connecting elements into respective engagement with said first and second latching elements in response to relative longitudinal closing movement between said barge and said pipeline support.

22. Apparatus according to claim 21 wherein each of said guide members has a slot for receiving a corresponding guide element, said first and second guide members being pivotal from a first position with the guide slots in misalignment with the latch slots into a second position with the guide slots and latch slots in registration one with the other thereby enabling guided movement of said first and second connecting elements, when said guide members receive said guide elements, into said first and second latch slots respectively.

23. Marine pipelaying apparatus comprising:

a pipelaying barge;  
floatable pipeline support structure adapted to support a portion of a pipeline as it is payed out from said barge, means carried by said barge and said pipeline support structure for releasably securing said barge and said pipeline support structure one to the other including a latching element carried by one of said barge and said pipeline support structure and a connecting element carried by the other of said barge and said pipeline support structure; said latching element having a slot for receiving said connecting element when said pipelaying barge and said pipeline support structure are secured one to the other;

means cooperable between said barge and said pipeline support structure for guiding said latching element and said connecting element relative to one another into latching engagement each with the other including a guide pivotally carried by said one of said barge and said pipeline support structure and having a slot for receiving said connecting element;

said guide being pivotal from a first position with the guide slot in misalignment with said latch slot into a second position with said guide slot and said latch slot in registration one with the other thereby enabling guided movement of said connecting element when received in said guide slot, into said latch slot; and

11

means carried by one of said barge and said pipeline support structure for releasably retaining said connecting element in said latch slot.

24. Apparatus according to claim 23 including a second latching element carried by one of said barge and said pipeline support structure and spaced transversely of the first mentioned latching element, a second connecting element carried by the other of said barge and said pipeline support structure and spaced transversely from the first mentioned connecting element, said second latching element having a slot for receiving said connecting element when said pipelaying barge and said pipeline support structure are secured one to the other, and means cooperable between said barge and said pipeline support structure for guiding said second latching element and said second connecting element relative to one another into latching engagement each with the other including a second guide pivotally carried by said one of said barge and said pipeline support structure and having a slot for receiving said second connecting element, said second guide being pivotal from a first position with its slot in misalignment with the second latch slot into a second position with said second guide slot and said second latch slot in registration one with the other thereby enabling guided movement of said second connecting element when received in said second guide slot, into said second latch slot, and means carried by one of said barge and said pipeline support structure for releasably retaining said second connecting element in said second latch slot.

25. Apparatus according to claim 24 including means interconnecting the first and second guides for substantial joint pivotal movement thereof.

26. Apparatus according to claim 25 wherein said interconnecting means includes a torsion shaft connected to said guides.

27. Apparatus according to claim 26 wherein said first and second latching elements are transversely spaced one from the other, said first guide being transversely spaced from and located on one side of said first latching element, said second guide being transversely spaced from and located on one side of said second latching element, the opposite ends of said torsion shaft being connected to said first and second guides respectively.

28. Apparatus according to claim 27 wherein said first and second guides are disposed between said first and second latching elements.

29. Apparatus according to claim 23 wherein said guide and said latching elements are transversely spaced one from the other, the guide having an entrance opening to said guide slot longitudinally spaced from the latch slot.

30. Apparatus according to claim 23 wherein said guide comprises a pair of spaced members having surfaces defining a guide slot therebetween, said guide surfaces diverging one from the other in a direction away from the pivotal axis of said guide.

31. Apparatus according to claim 23 wherein said guide and said latching element are transversely spaced one from the other, said guide defining an entrance opening to said guide slot longitudinally spaced from said latch slot, the pivotal axis of said guide being longitudinally spaced from said latch slot and lying on the opposite side thereof from the entrance opening.

32. Marine pipelaying apparatus comprising:  
a pipelaying barge;

12

an elongated floatable pipeline support structure adapted to support a portion of a pipeline as it is payed out from said barge, means carried by said barge and said pipeline support structure for releasably securing said barge and said pipeline support structure one to the other adjacent the aft end of said barge and including first and second transversely spaced latching elements carried by one of said barge and said pipeline support structure and first and second transversely spaced connecting elements carried by the other of said barge and said pipeline support structure;

means cooperable between said barge and said pipeline support structure for guiding said first and second latching elements and first and second connecting elements relative to one another into respective latching engagement one with the other with said first latching element in latching engagement with said first connecting element and said second latching element in latching engagement with said second connecting element; and

means including said guide means for positively preventing latching engagement of said first latching element and said first connecting element without latching engagement of said second latching element and said connecting element.

33. Apparatus according to claim 32 wherein said preventing means includes first and second transversely spaced guides pivotally carried by one of said barge and said pipeline support structure and engageable with the first and second connecting elements respectively, and means coupling said guides one to the other for joint pivotal movement.

34. Apparatus according to claim 33 wherein each of said guides has a slot for receiving the associated connecting element, said first guide being pivotal from a first position with the guide slot in misalignment with the first latch slot into a second position with said first guide slot and said first latch slot in registration one with the other thereby enabling guided movement of the first connecting element when received in the first guide slot into the first latch slot, said second guide being pivotal from a first position with its guide slot in misalignment with the second latch slot into a second position with said second guide slot and said second latch slot in registration one with the other thereby enabling guided movement of the second connecting element when received in the second guide slot into said second latch slot, and means carried by one of said barge and said pipeline support structure for releasably retaining the first and second connecting elements in said first and second latch slots respectively.

35. Marine pipelaying apparatus comprising:

a pipelaying barge;  
floatable pipeline support structure adapted to support a portion of a pipeline as it is payed out from said barge, means carried by said barge and said pipeline support structure for releasably securing said barge and said pipeline support structure one to the other including a latching element carried by one of said barge and said pipeline support structure and a connecting element carried by the other of said barge and said pipeline support structure; said latching element having a slot for receiving said connecting element when said pipelaying barge and said pipeline support structure are secured one to the other;

13

means cooperable between said barge and said pipeline support structure for guiding said latching element and said connecting element relative to one another into latching engagement each with the other including a guide movably carried by said one of said barge and said pipeline support structure and a guide element carried by the other of said barge and said pipeline support structure, said guide having a slot for receiving said guide element;  
said guide being movable from a first position with the guide slot in misalignment with said latch slot into a second position with said guide slot and said latch slot in registration one with the other in response to engagement of said guide element and said guide and closing movement of said barge and said pipeline support structure thereby enabling guided movement of said connecting element into said latch slot; and  
means carried by one of said barge and said pipeline support structure for releasably retaining said connecting element in said latch slot.

36. Apparatus according to claim 35 including a second latching element carried by one of said barge and said pipeline support structure and spaced transversely of the first mentioned latching element, a second connecting element carried by the other of said barge and said pipeline support structure and spaced transversely

14

from the first mentioned connecting element, said second latching element having a slot for receiving said connecting element when said pipelaying barge and said pipeline support structure are secured one to the other, and means cooperable between said barge and said pipeline support structure for guiding said second latching element and said second connecting element relative to one another into latching engagement each with the other including a second guide movably carried by said one of said barge and said pipeline support structure and a second guide element carried by the other of said barge and said pipeline support structure, said second guide having a slot for receiving said second guide element, said second guide being movable from a first position with its slot in misalignment with the second latch slot into a second position with said second guide slot and said second latch slot in registration one with the other thereby enabling guided movement of said second connecting element into said second latch slot, and means carried by one of said barge and said pipeline support structure for releasably retaining said second connecting element in said second latch slot.

37. Apparatus according to claim 36 wherein said first and second guides are mounted for pivotal movement, and means interconnecting the first and second guides for substantial joint pivotal movement thereof.

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