July 31, 1934. G. R. TAYLOR 1,968,577

AUTOMATIC STEERING DEVICE FOR BARGES AND LIKE VESSELS

Filed July 19, 1933

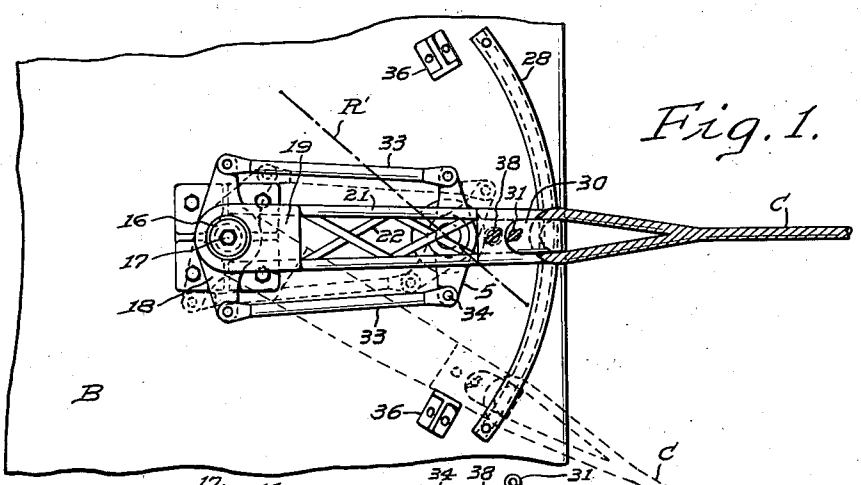


Fig. 1.

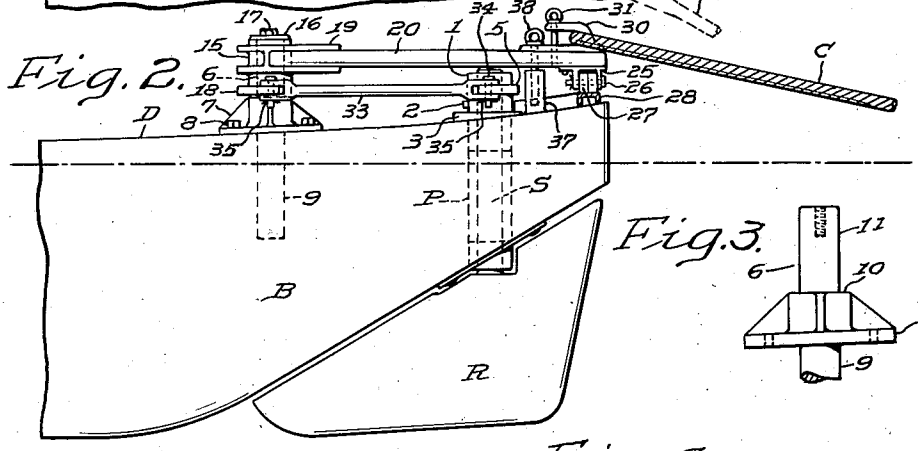


Fig. 2.

Fig. 3.

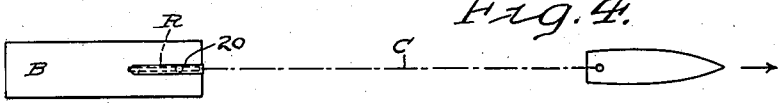


Fig. 4.

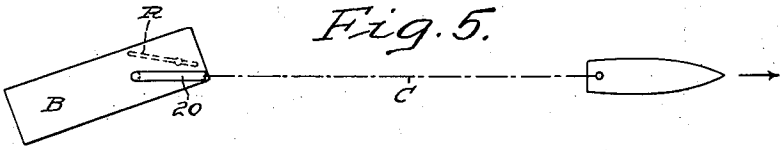


Fig. 5.

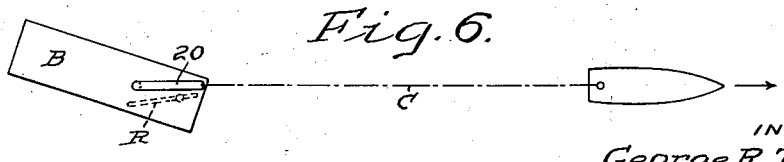


Fig. 6.

INVENTOR
George R. Taylor.
BY George K. Hubbard
ATTORNEY

WITNESS
F. J. Hartman.

Patented July 31, 1934 1,968,577

UNITED STATES PATENT OFFICE

1,968,577

AUTOMATIC STEERING DEVICE FOR BARGES AND LIKE VESSELS

George R. Taylor, Woodlynne, N. J., assignor to John H. Mathis Company, Camden, N. J., a corporation of New Jersey

Application July 19, 1933, Serial No. 681,079

8 Claims. (Cl. 114—236)

Most barges, particularly those of the scow type having rake ends, substantially parallel sides and a flat or substantially flat bottom, have a tendency to yaw and sheer about when being towed, particularly when the distance between the tug and the barge is considerable and a long tow line is therefore required, which tendency is frequently emphasized by wind and current conditions. As a result, much difficulty is often experienced in towing such barges through narrow or sinuous channels or in the neighborhood of other vessels, piers and the like, and strandings and collisions sometimes result. Moreover, any material departure of the barge from its proper course brings it more or less at an angle to the latter and requires the expenditure of additional power on the part of the tug to return it thereto, assuming it can be brought back at all.

Various expedients and devices have been proposed with a view to remedying these conditions by constraining the barge to properly follow the tug, at least under the usual conditions encountered when towing vessels of this general class, but as far as I am aware none of them has been entirely satisfactory for its intended purpose.

It is therefore the principal object of this invention to provide means automatically operative to cause a barge or other generally similar vessel to maintain a proper course after the tug or other vessel by which it is being towed irrespective of local tide and wind conditions and the like.

A further object of the invention is the provision of means of the character aforesaid which are effective to cause the barge to substantially follow the course of the tug when the latter is proceeding through sinuous channels, necessitating frequent turns to starboard or port, and thus prevent the barge from grounding on one side or the other of the channel because of inability to properly respond to the variations in the course of the tug.

Still further objects of the invention are the provision of apparatus which is automatically effective to prevent the barge from yawing or sheering about when being towed with a long hawser by operating the rudder in the proper direction to return the barge to its true course whenever it tends to depart therefrom; which is simple and rugged in construction, comparatively cheap, not liable to get out of order or become damaged under the conditions of use to which such apparatus is necessarily subjected, and which may be readily installed on existing barges as well as on new ones while they are being built.

Other objects, advantages and novel features of design, construction and arrangement inherent in or comprehended by the invention are hereinafter more particularly mentioned or will be apparent to those skilled in the art from the following description of one embodiment thereof as illustrated in the accompanying drawing in which Fig. 1 is a fragmentary plan view of the apparatus operatively installed adjacent the bow of a barge of the type to which the invention is particularly applicable; Fig. 2 is a fragmentary side elevation of the parts shown in Fig. 1; Fig. 3 is a detail view of one of said parts, and Figs. 4, 5 and 6 are respectively diagramamtic views designed to show the operation of the invention under various conditions. Like characters of reference are used to designate the same parts in the several figures.

The invention is of particular utility when installed on a barge or generally similar vessel having a bow rudder, and I have therefore shown in the drawing a portion of the bow of a barge B of conventional type provided with a bow rudder R which may be of any preferred shape and construction. In accordance with the usual practice, the rudder is mounted at the lower end of a rudder stock S extending through a rudder port P to terminate at a suitable distance above the deck D of the barge. In accordance with the present invention, I fixedly though preferably removably secure to this projecting end of the rudder stock a collar 1 by means of a pin or bolt 2 or in any other suitable way so that the collar will turn with the stock, a plate 3 being desirably fitted beneath the collar and secured to the deck to compensate for the sheer of the latter and afford a suitable bearing for the lower face of the collar so as to properly support the stock and rudder. This collar is provided with a preferably integral yoke 5 having oppositely directed arms, each having a hole near its free end, extending outwardly from the collar and thus lying athwartships when the rudder is parallel with the keel. At a suitable distance astern of the rudder stock and collar, I secure to the deck D a bitt or post generally designated as 6, the center of which is in vertical alignment with the keel. The bitt comprises a base 7 having flanges adapted for the reception of bolts 8 for securing it to the deck and, preferably, a downwardly projecting shank 9 inserted in the structure of the barge to afford additional rigidity to the post as a whole. As best shown in Fig. 3, at a suitable distance above the deck the post is reduced in diameter to form a shoulder 10 and a stem 11 projecting thereabove about which is rotatably disposed a collar 15 the lower face of which seats on the shoulder, and for holding the collar in place on the stern suitable means are provided such, for example, as a keeper plate 16 overlying the upper face of the collar and removably secured thereto by a bolt 17 threaded into the upper end of the stem, the collar thus being free to rotate upon the latter.

The collar 15 is provided with a yoke 18, pref-

erably integral with the collar, having oppositely directed arms, each of which has a hole near its free end, generally corresponding to those of the yoke 5 although preferably somewhat longer, and also, above this yoke, with a forwardly extending jaw 19 likewise preferably integral with the collar adapted to receive and retain the rear end of a tiller 20 which projects forwardly in the same vertical plane as the rudder to terminate adjacent the bow of the barge at a point in advance of and above the rudder stock. This tiller may be of any suitable construction, the particular form illustrated embodying side members 21 and diagonal struts 22, such an arrangement forming a light yet strong structure, but if preferred, a solid tiller or one of any other design may be utilized.

A jaw 25 is secured to the under face of the tiller adjacent its forward end to form a support for a pin 26 upon which within the jaw are rotatably mounted one or more rollers 27 adapted to engage a curved track 28, secured to the deck of the barge, approximating an arc of which the axis of bitt 6 is the center. The rollers and track thus afford adequate support to the forward end of the tiller and relieve the bitt and associated parts to a considerable extent from stresses which would otherwise be imposed thereon by the weight and downward pull of the towing cable or hawser C leading to the tug or other towing vessel. This cable is attached to the forward end of the tiller in any suitable way, conveniently by means of a hook 30, secured to the upper face of the tiller, having a removable latch pin 31 effective to prevent the eye in the end of the cable from slipping out of the hook after it is engaged thereover.

The arms of yoke 5 are respectively connected with the corresponding arms of yoke 18 by means of links 33 provided with clevis jaws at their extremities receiving the ends of the arms and pivoted to the latter by vertically extending clevis pins 34 passing through the holes in the ends of the arms and jaws, these pins being prevented from backing out of assembled position by cotter pins 35.

Adjacent the end of track 3 and preferably slightly behind the latter so as to lie in the path of the tiller, stops 36 are secured to the deck of the barge so as to limit movement of the tiller in either direction to a predetermined amount, while for holding the tiller stationary in parallel relation to the keel when desired, a locking post 37 may be mounted on the deck between the rudder stock and track, this post being bored for the reception of the lower end of a removable locking pin 38 which can be dropped through a hole in the tiller and into the bore in the post as shown, the tiller being of course free to move along the track in either direction when the pin is withdrawn to initiate automatic control of the course of the barge.

When the locking pin 38 is in place, the rudder is of course held parallel to the keel of the barge and is thus ineffective to control the course of the latter, a condition which is sometimes desirable when working the barge in and out of slips or around piers or when it is lashed alongside the tug so as to move unitarily with the latter. However, for normal towing conditions the locking pin 38 is removed so the tiller can oscillate to swing within the limits defined by stops 36 and thereby turn the rudder through the medium of the mechanism interposed between the tiller and the rudder stock.

When the tug is proceeding on a straight course and the barge properly following it as shown in Fig. 4, the pull of the hawser on the tiller maintains the latter in a substantially fore and aft position, and the rudder is thus held parallel with the keel of the barge or substantially so. However, if the stern of the barge because of some local condition or the like tends to slue to port and the bow of the barge to starboard, as indicated in Fig. 5, so that the hull of the barge assumes a more or less angular position with respect to the lead of the hawser to the tug, the tiller is immediately swung to starboard, considered with respect to the barge, and so moves the rudder in a direction to turn the bow of the barge back toward its proper course, the limit position of the tiller being indicated in dotted lines in Fig. 1 and corresponding position of the rudder by the broken line R'. As the barge then gradually straightens out under the influence of the rudder, the tiller likewise swings toward fore and aft position which it reaches substantially coincident with the return of the barge to the proper course and, should the barge overrun the latter a little, the rudder swings momentarily slightly to port so as to compensate therefor by turning the barge in the opposite direction. In like manner, should the stern of the barge tend to slue to starboard and the bow to port, as indicated in Fig. 6, the tiller is swung to port in an amount commensurate with the deflection of the barge from its true course so as to ultimately return the barge thereto. Under practical conditions of operation, since the response of the rudder to any change of course of the barge is substantially immediate and thus tends to check any deviation from the true course before it proceeds very far, the angular movement of the rudder in either direction from fore and aft position is generally slight and seldom attains the permissible maximum as determined by the stops. Moreover, because of the difference in length of the yokes and the relatively great length of the tiller, a comparatively slight angular pull on the latter is not only effective to exert a large turning moment on the rudder stock and rudder but also to turn the latter through a somewhat greater arc than that through which the tiller is moved, as indicated in Fig. 1, so that the apparatus as a whole is responsive and sensitive and efficiently controls the course of the barge.

Furthermore, it frequently happens that the rudder must be maintained at an angle to the keel in order to counteract the influence of a heavy cross tide or wind, and under these conditions the apparatus operates equally well, automatically holding the barge on its course though in a slightly angular relation thereto, the rudder being automatically turned in either direction from its generally constant slightly angular position to compensate for temporary variations in the tide or wind pressure against the barge.

Whenever the tug changes its course so as to bring the cable into angular relation with the direction in which it previously led, the tiller is correspondingly swung to starboard or port as the case may be so as to turn the bow of the barge toward the new course, and thereafter operates to hold it thereon as long as that course is maintained.

It will therefore be apparent that the apparatus of my invention is automatically operative to properly control the course of the barge through the direction of the pull exerted on the tiller by the hawser leading to the towing vessel whenever the locking pin or other means provided

for maintaining the tiller in alignment with the keel is disengaged and that, in consequence, the towing of barges and like vessels equipped with the apparatus is facilitated and many of the dangers heretofore incident thereto are avoided.

While I have herein described a preferred embodiment of my invention with considerable particularity, I do not thereby desire or intend to specifically limit or confine myself thereto as changes and modifications may be made in the design, construction and arrangement of the various elements forming component parts of the apparatus without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim and desire to protect by Letters Patent of the United States:

1. The combination with a barge or like vessel having a rudder and a rudder stock, of rudder actuating means comprising a bitt, a tiller supported for oscillation on the bitt adapted for direct connection to a towing hawser, an arm movable with the tiller, an arm movable with the rudder stock, and means connecting the ends of said arms whereby movement of the tiller about the bitt is effective to move the rudder.

2. The combination with a barge or like vessel having a bow rudder and a rudder stock, of rudder actuating means comprising a tiller adapted for connection with a towing hawser, a bitt, means supporting the tiller for oscillation about the bitt, a yoke movable with the tiller about the bitt, a yoke movable with the rudder stock, and means connecting the respective ends of the yokes whereby movement of the tiller about the bitt is operative to correspondingly turn the rudder through a greater arc.

3. The combination with a barge or like vessel having a bow rudder and a rudder stock, of rudder actuating means comprising a forwardly extending tiller adapted for connection to a towing hawser, a bitt, means supporting the tiller for oscillation about the bitt, means affording vertical support to the forward end of the tiller, a yoke movable with the tiller about the bitt, a yoke movable with the rudder stock, and links connecting the respective arms of the yokes whereby movement of the tiller is operative to turn the rudder in a like direction.

4. The combination with a barge or like vessel having a rudder and a rudder stock, of rudder actuating means comprising a forwardly extending tiller adapted for connection to a towing hawser, a bitt disposed astern of the rudder stock, means supporting the tiller for oscillation about the bitt, means affording vertical support to the forward end of the tiller, a yoke movable with the tiller about the bitt having oppositely outwardly projecting arms, a yoke movable with the rudder stock having correspondingly outwardly projecting arms, and links extending between and connected to the corresponding arms of the yokes, the distance between the axis of oscillation of the first mentioned yoke and its points of connection with the links being greater than the distance between the axis of oscillation of the second mentioned yoke and its points of connection with the links.

5. The combination with a barge or the like having a bow rudder and a rudder stock, of a bitt, a tiller normally extending forwardly from the bitt adapted for connection to a towing hawser, means supporting the tiller for oscillation about the bitt, a yoke, having oppositely projecting arms, arranged for oscillation about the bitt in correspondence with the movements of the tiller, a yoke carried by the rudder stock also having oppositely projecting but relatively shorter arms, and links extending between and connected to the corresponding arms of the yokes whereby the movement of the tiller in either direction from fore and aft position induced by changes in the angular relation between the barge and the hawser is operative to turn the rudder through a greater angle to direct the bow of the barge in a similar direction.

6. The combination with a barge or the like having a bow rudder and a rudder stock, of a bitt, a tiller extending forwardly from the bitt adapted for connection to a towing hawser, means supporting the tiller for oscillation about the bitt, a yoke, having oppositely projecting arms, arranged for oscillation about the bitt in correspondence with the movements of the tiller, a yoke carried by the rudder stock also having oppositely projecting arms, and links extending between and connected to the corresponding arms of the yokes, the distance between the axis of the bitt and the points at which the links are connected to the arms of the first mentioned yoke being greater than the distance between the axis of the rudder stock and the points at which the links are connected to the second mentioned yoke whereby the movement of the tiller in either direction from fore and aft position induced by changes in the angular relation between the barge and the hawser is operative to turn the rudder through a progressively greater angle to thereby turn the bow of the barge in a similar direction.

7. The combination with a barge or the like having a bow rudder and a rudder stock, of means for actuating the rudder in correspondence with changes in the angular relation between the barge and the hawser by which it is being towed, comprising a bitt disposed astern of the rudder stock, a tiller supported for oscillation about the bitt, extending forwardly therefrom, and adapted for connection with said hawser, a yoke arranged for oscillation about the bitt in correspondence with the oscillations of the tiller and provided with outwardly oppositely extending arms, a yoke carried by the rudder stock also having outwardly extending arms and links connecting the corresponding arms of the yokes, an arcuate track disposed beneath the forward end of the tiller on an arc of which the axis of the bitt is the center, and a roller, carried by the tiller, bearing on said track to afford support to the former.

8. The combination with a barge or the like having a bow rudder, of rudder actuating means comprising a bitt, a tiller supported for oscillation on the bitt, extending forwardly therefrom, and adapted for connection to the towing hawser, and means interconnecting the tiller with the rudder operative when the tiller is swung to either side from normal fore and aft position by a change in the angular relation between the barge and the hawser to turn the rudder in the same direction through a progressively greater angle and thereby alter the course of the barge.

GEORGE R. TAYLOR.