

(No Model.)

3 Sheets—Sheet 1.

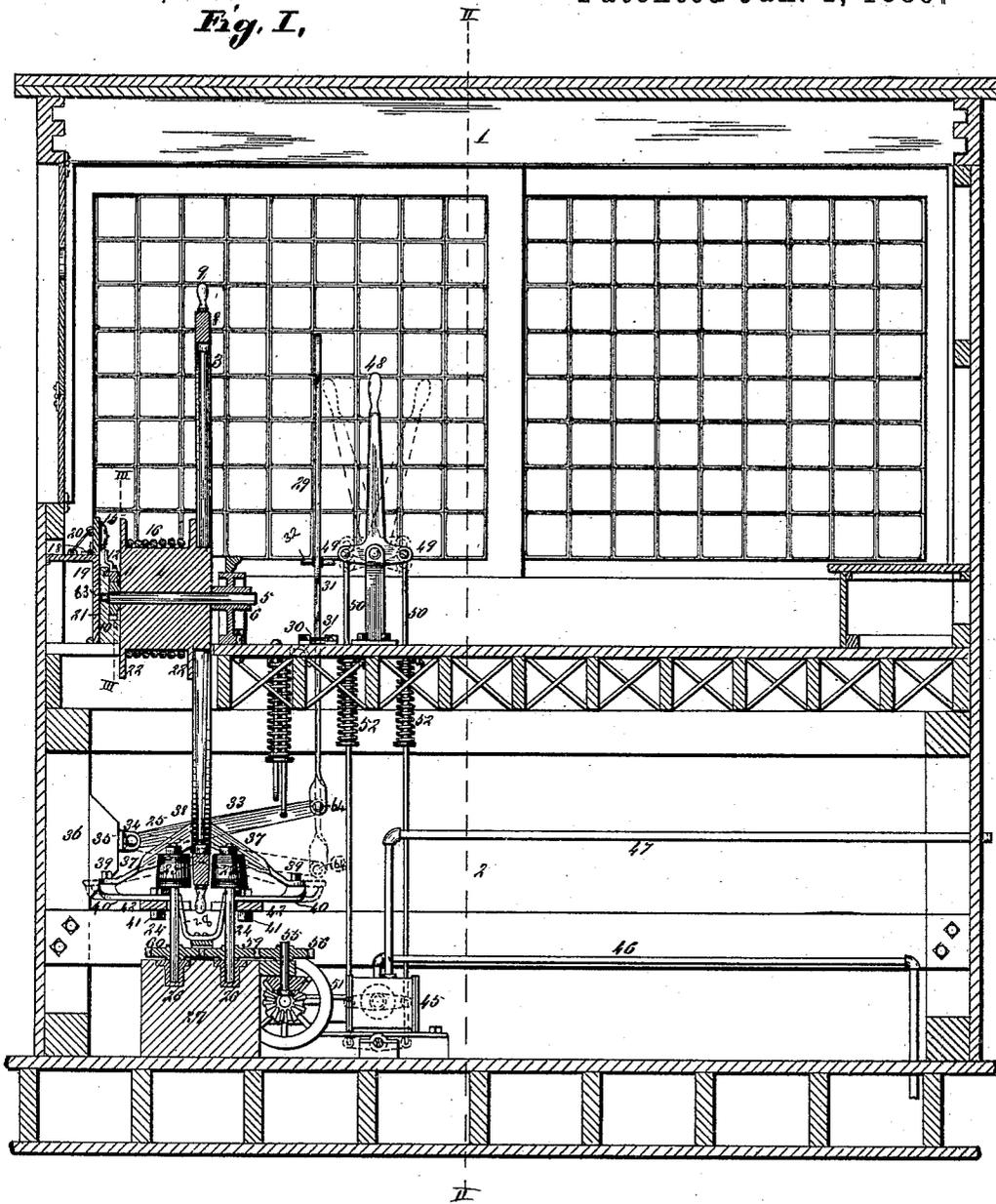
J. HAYES.

STEERING APPARATUS.

No. 395,565.

Patented Jan. 1, 1889.

*Fig. I,*



*Attest;*  
*Charles Pickles,*  
*Emma Arthur.*

*Inventor;*  
*John Hayes*  
*By Knight Bros.*  
*Attys*

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Fig. 11,

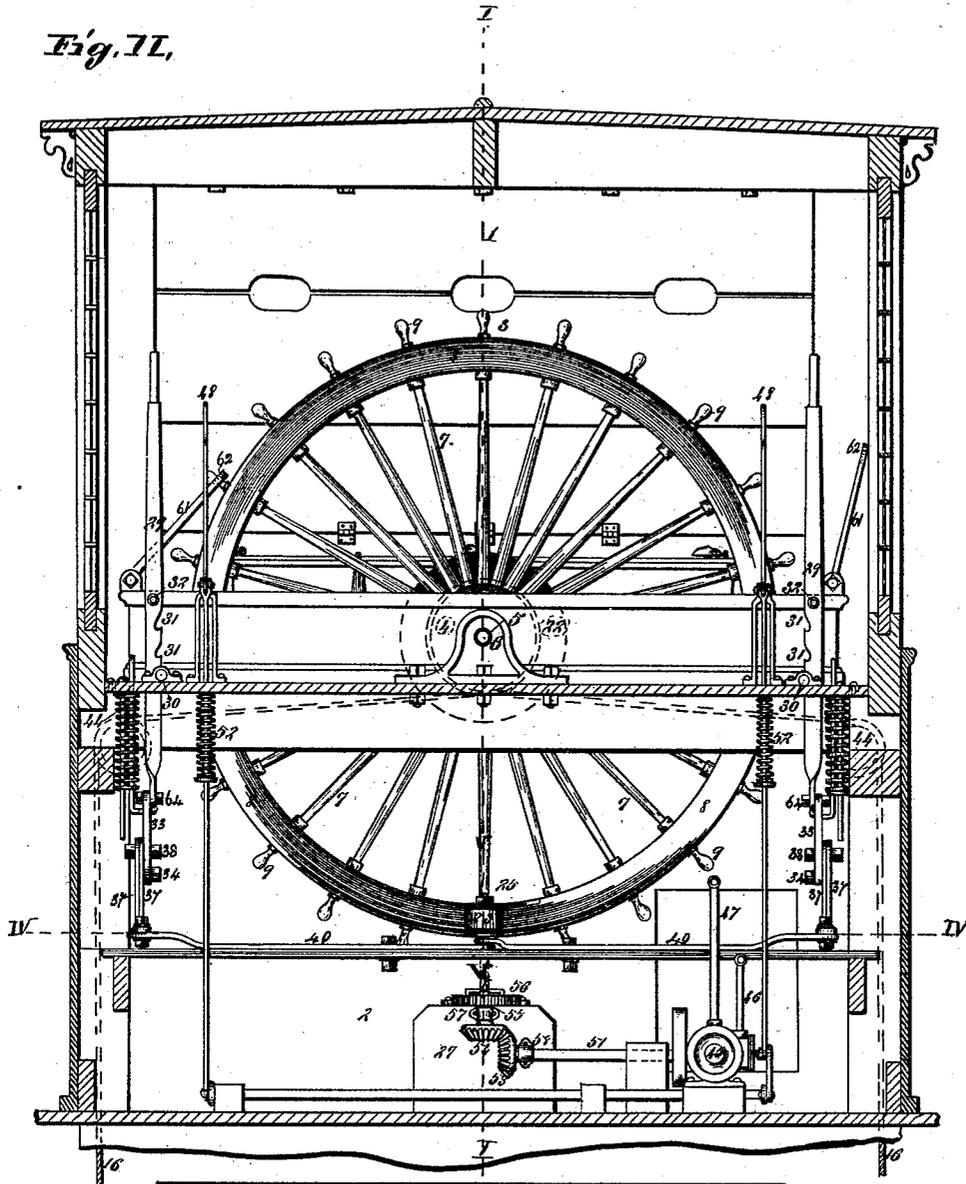
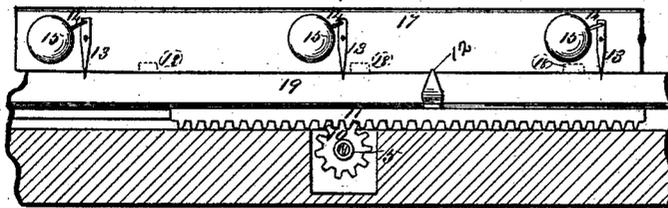


Fig. 111,



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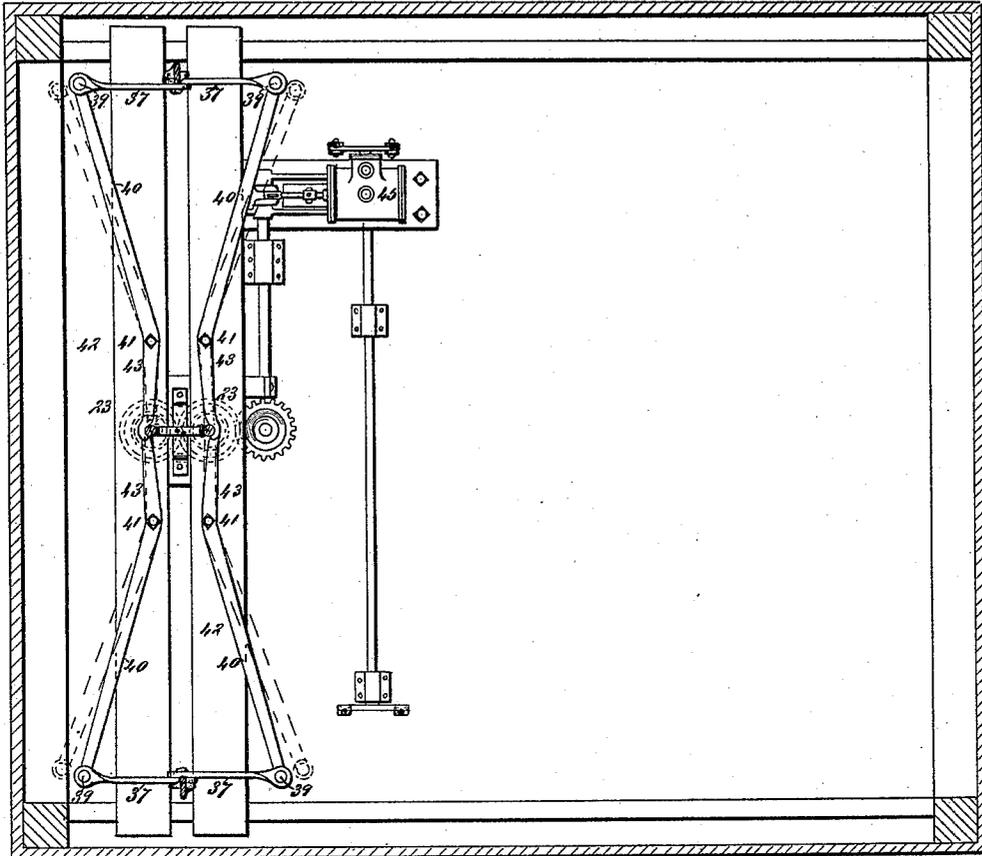
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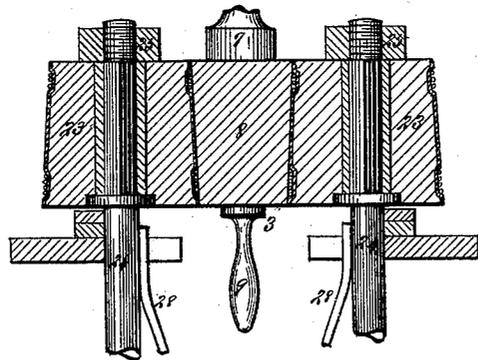
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*Fig. V.*



*Fig. V.*



*Attest;*

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# UNITED STATES PATENT OFFICE.

JOHN HAYES, OF ST. LOUIS, MISSOURI.

## STEERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 395,565, dated January 1, 1889.

Application filed April 6, 1888. Serial No. 269,826. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN HAYES, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Steering Apparatus for Steamboats, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, and in which—

10 Figure I is a longitudinal section of the pilot-house, taken on line II II, Fig. II, and shows also the power-room beneath containing the donkey-engine and the operative devices. Fig. II is a vertical section taken on line II II, 15 Fig. I, and shows another view of the pilot-house and operative devices from a different point. Fig. III is a vertical section taken on line III III, Fig. I, showing the indicating alarm for the steerage record. Fig. IV is a 20 plan section taken on line IV IV, Fig. II, showing the clamping apparatus; and Fig. V is a detail section on line V V, Fig. II, showing the tension-rollers and their location against the rim of the wheel.

25 This invention relates to devices for steering steam-tugs and other vessels; and the invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

30 Referring to the drawings, in which like figures of reference indicate like parts in all the views, 1 represents the pilot-house, in which, and in the power-room 2 beneath it, my steering devices are chiefly located.

35 3 represents the pilot-wheel proper; 4, the drum-hub of said wheel; 5, the axle on which said wheel works; 6, the journal-box in which said axle has its bearings; 7, the spokes; 8, the rim, and 9 the handles around the rim of said 40 wheel.

The axle of the pilot-wheel has tight bearings in the drum-hub of the wheel and loose bearings in the journal-box 5, and is provided at its other extremity with a pinion-wheel, 10, 45 which has tight bearings on the shaft, and as the pinion rotates (when the pilot-wheel is moved) its teeth mesh within the teeth of the rack 11 and move it longitudinally, so that its surmounting trip-finger 12 engages at each end 50 and at the intermediate stage of its movement with the pivoted triggers 13, whose attached

hammers 14 strike the alarm-bell 15, and thus indicate, relatively, the position (at the time) of the pilot-wheel and tiller-rope 16, and the consequent position of the rudder that they 55 control.

I have shown three of these indicating or alarm bells, which mark the medium and the extreme positions of the rudder. That number is sufficient for all necessary purposes; 60 but I do not confine myself to that number, which may be increased or diminished. The bells are especially intended for use as an indicating device for the pilot after night or when passing through fogs, and are preferably 65 attached to a board, 17, which is secured by hinges 18 to the bracket-frame 19 beneath it. When the alarm is in use, the board is kept elevated by the hooks 20; but when not required the hooks may be detached and the 70 board laid back on the top of said bracket-frame. The axle 5 may, if desired, be provided with an extension, 63, beyond the pinion-wheel 10, and is then supported in loose bearings in the head-block 21, which occupies 75 the space between the drum-hub and the bracket-frame 19.

The drum-hub is provided with deep flanged rims or spool-heads 22, which retain in their seat around the drum the multiple tension- 80 of the tiller-rope 16.

23 represents conical twin tension-rollers that are located on each side of the rim of the pilot-wheel at its lowest dip. These rollers have tight bearings on the upper ends of the 85 vertical rotary shafts 24, to which they are secured by the nuts 25 on their screw-heads. These shafts are stepped in and have loose bearings in the socket-boxings 26, which are embedded in the bed-sill 27. The tension-rollers 90 when in their inoperative position, are thrown free of contact with the rim of the pilot-wheel by the push U-spring 28, which presses against both the roller-shafts and thus frees the tension-rollers, as shown in Fig. I; 95 but when said tension-rollers are to be brought into operative tension the lever or push rod 29 on each side of the wheel-frame is dislodged from the grip-bolt 30, that is seated in one of the curved slots 31, and is then pushed 100 down by the foot of the operator or pilot placed on the step 32. This action lowers the com-

pound lever 33, (with which said push-rod connects by the pivot-bolt 64,) which at its fast end has a pivotal connection, 34, with the projection 35, that is secured to the post 36 of the main frame of the power-room. When said lever is forced down to the position shown in dotted lines in Fig. I, it presses on the apex of the twin toggle levers or links 37, which links are coupled together and at an intermediate position to the compound lever 33 by the pivot-bolt 38. The said toggle-levers are secured at their drive ends by pivot-bolts 39 to the driven ends of the compound toggle-levers 40, that work on fulcrum-pivots 41, secured in the supporting-beams 42. Short arms 43, integral with the main levers, extend from said fulcrum-pivots to the vertical shafts 24 of the tension-rollers, and hooks 44 at the ends of the arms grasp the shafts, and as the toggle-lever clamp, above described, is operated by the push-rod from above the tension-rollers are thus by the action of the compound toggle-levers, made to forcibly grip the rim of the pilot-wheel. At the same time one of the upper curved slots in each of the push-rods 29 is made to grasp the grip-bolts 30 and the clamping device that makes the tension-rollers operative is thus with the rollers locked to its operative position. When it is desired to again loosen the tension, all that is required is to unseat the rods or levers 29 from the grip-bolts 30, when the spiral pull-springs 44, that draw from near the free ends of the levers 33 toward the ceiling beneath the floor of the pilot-house to which the upper end of the spring is secured, elevate said lever and unclamp the toggle-levers and therefore the tension-rollers also. The lower curved slots in the levers or rods are then made to engage in the grip-bolts 30, and the device is then locked in its free position, the elevation and consequent release of the tension-grip having been effected by said pull-springs with no effort on the part of the pilot other than the transfer of the grip-bolts from their upper to their lower seat in the lever or rod 29. An intermediate curved slot provides the means for locking the rollers at a graduated or light tension.

I will now describe the actuating devices for the movement of the pilot-wheel.

45 represents a donkey-engine of any usual suitable construction for actuating the devices. I do not describe the parts and action of said engine, except in so far as is necessary to the right understanding of the operation of my invention, as there is nothing novel in the engine itself.

46 is the steam-supply pipe and 47 the exhaust.

48 is the throttle-lever, whose rocker-arms 49 work the reciprocating piston-rods 50, that relatively open the valves to effect either a forward or reverse movement of the boss drive-shaft 51. Balance-springs 52 connect the piston-rods to the ceiling of the power-room, and erect the lever to its vertical posi-

tion to shut off the steam when the pilot's hand is removed from the lever.

The cogs of the bevel-pinion 53, which has tight bearings on the box drum-shaft, mesh with the cogs of a like bevel-pinion, 54, that has tight bearings on the foot of the short vertical shaft 55, which is surmounted by and carries rigidly secured thereto the geared pinion 56. The said shaft and the drive end of the box-shaft have bearings, respectively, within the strap-brackets 57 and 58, that are secured to the bed-block or sill 27, and hold said shafts and the bevel-pinions they carry in juxtaposition to each other.

The cogs of the pinion 56 mesh into those of the pinion 59, which has tight bearings on the first of the twin vertical shafts 24, that carry the tension-rollers, and the cogs of the pinion 59 mesh into those of a like pinion, 60, on the corresponding twin shaft that carries the co-operative tension-roller.

It will thus be seen that when the tension-rollers (as before described) have been brought into frictional contact with the rim of the pilot-wheel, and when the throttle-lever is thrown to one of the positions shown in dotted lines in Fig. I, and the descent of the piston-rod on that side opens the port for the escape of steam to drive the box-shaft in one of its two directions, the bevel-pinion gear then acts on the pinion-wheels 56, 59, and 60, and so rotates the vertical shafts 24 and the tension-rollers they carry to turn the pilot-wheel in one direction. When the throttle-lever is reversed and thrown into the other direction, (shown, also, in dotted lines in Fig. I,) the first port is closed, the reverse port opened, and the box-shaft is rotated in the reverse direction, so as, through its bevel-pinion and pinion-gear, to reverse the action of the rollers on the rim of the pilot-wheel, which then turns in the reverse direction.

At night or in foggy weather the indicating device, as before described, can be brought into operation by elevating the bell-register board 17, so that, as previously described, the position of the pilot-wheel and corresponding position of the rudder are indicated by the record of the bells.

Pivoted bridle-bars 61, on each side of the wheel, have loops 62 at their upper ends, that are made to engage with the handles 9 of the pilot-wheel when it is desired to lock it in any desired position.

I claim as my invention—

1. In a steering device for boats, the combination, with the pilot-wheel, of tension-rollers adapted to bear against said wheel and toggle-levers for enforcing and a spring for releasing the tension of said rollers on said wheel, substantially as and for the purpose set forth.

2. In a steering device for boats, the combination, with the pilot-wheel and tension-rollers adapted to bear on opposite sides of said wheel, of toggle-levers for enforcing and a spring for releasing the tension of said rollers upon said wheel, and an engine for rotat-

ing said rollers to turn said wheel, substantially as set forth.

3. The combination, with the pilot-wheel and shaft upon which it is mounted, of the pinion on said shaft, a segment-rack engaged by said pinion, a finger carried by said rack, and bells arranged to be sounded by the movement of said finger, as set forth.

4. In a steering device for steamboats, the combination of the tension-rollers, the push-rods 29, the grip-bolts 30, that lock the push-rods, and connecting-levers and toggle-links for enforcing and releasing the tension of the rollers, substantially as and for the purpose set forth.

5. In a steering device for steamboats, the combination of the tension-rollers, means for enforcing and releasing their tension, throttle-lever 48, and reciprocating piston-rods 50, an engine whose reciprocating valves are operated by said rods, a drive-shaft, 51, actuated by said engine, the gear driven by said shaft, and the vertical shaft 24 of the tension-roll-

ers arranged, as the throttle-lever is thrown relatively to the one hand or to the other, to rotate the rollers in corresponding directions, and when said rollers are under tension to turn the pilot-wheel and the rudder it commands to either hand, as required, substantially as and for the purpose set forth.

6. In a steering device for steamboats, the tension-rollers, means for enforcing and releasing their tension, means for utilizing steam-power from an engine by the throw of the throttle-lever in either direction to turn said tension-rollers and pilot-wheel against which they press, and the rack 11, trip-finger 12, and pivoted triggers 13, that as the pilot-wheel turns are actuated by their connecting-gear to trip the hammers 14 and strike the bells 15 to record the position of said rudder, substantially as and for the purpose set forth.

JOHN HAYES.

In presence of—

C. H. LAWSON,  
GEO. O. ROGERS.