

THE CIGAR SHIP.

In our last impression we sketched the history of the Winans yacht, explained the nature of the objects which her builders have in view, discussed at some length the general arrangements of the vessel, and, we hope, dispelled a few erroneous impressions. In this article we propose to consider certain details of her fittings, leaving her boilers and engines the subject for a concluding paper.

We have stated that exceptional expedients were adopted to exclude water from the companions. These may be described in a few words. Each companion-way has two doors opening athwart ships, or as sailors say, lee and weather. They are exceedingly strong, and in their construction greatly resemble the doors of a railway carriage, being each fitted with a plate-glass falling sash, within which slides a steel "blind" or dead light. In hard weather the glass is lowered and the blind raised. The door itself closes on india-rubber, and though not so strong as those in the bulkheads, it can be made equally water-tight. Besides the doors, wash plates are provided, which being fitted into the doorway when the doors are open, project about 18in. above the deck, which therefore must be flooded to that depth, or nearly so, before water can enter the cabins. Descending the after companion stairs we find it terminate in a lauding, on which open four doors, two leading into state rooms aft, two into the main saloon. This arrangement is rendered necessary by the fact that the axis of the ship is traversed from end to end the main shaft, of Krupp's steel. The decks being 20in. below the central line of the ship, the shaft is covered by the tables in the saloons forward and aft. That in the main saloon affords ample accommodation for twenty persons. The landing at the foot of the companion is thus on a level with the top of the table, and is separated from it by the stairs, which, sloping back over the table are concealed by a mirror and a fine American eagle with outstretched wings hovering above. A few steps at each side lead directly into the saloon. This last has of course a circular roof, and is lighted during the day from the deck above by means of bull's-eyes, each of which is fitted with an iron dead light, to be screwed on in hard weather, and at night by two magnificent lustres of glass, cut "brilliant" fashion. Even about these there is something remarkable in the fact that but six have been made, three of which are on board the yacht of the Sultan, the sixth hangs in the fore saloon of the Ross Winans. Settees, covered with rich brocade, run along the sides of the saloon. Heavy carpets hide the steel decks. Mirrors and cut glass, and delicate creamy-tinted paint, just redeemed from monotony by a touch of red, and a narrow line of gold on the bulb angle iron rings, render the saloon one of the most exquisitely decorated apartments we have ever seen on board ship.* A bearing for the shaft is artfully concealed beneath the centre of the table within what is apparently a leg. In order to avoid trouble in oiling this some ingenuity has been displayed. Without going into detail it will suffice to say that a little door being opened just beneath the slab of the table, a tin box of peculiar shape is inserted, containing oil, which is fed automatically to the shaft. A lady could perform the operation without soiling her fingers. Nor are the state rooms unworthy of notice. They have been planned with the utmost care and skill by Mr. Hambleton, who designed all the internal arrangements of this kind, and space has been economized to the utmost. Each room is fitted with a wide settee covered with morocco leather, and fitted with a deep back precisely the same. This back is swung up at night on hinges, and being suspended from the deck overhead by stout brass chains it constitutes one berth, the couch below forming another berth†. The shaft of course separates the state rooms on either side the ship, and the space beneath it is fitted up with drawers and lockers—a system which has been extended even to the steps down which we descend to enter the rooms. These draw out, and turn on hinges, and slide to one side, displaying lockers and boxes in which to stow books or maps or personal effects. In like manner space is economised in the sailors' and firemen's cabins; the screw shaft case forming, as before, a table for the accommodation of the men, the space beneath being fitted up with lockers.

It is obvious that nothing but extraordinary precautions could secure adequate ventilation in a ship containing so many compartments, and supplied with air solely from above. There is every reason to believe, however, that the measures adopted will leave little to be desired. Each of the state room doors is lifted at the bottom with a species of covered grating and a register, so constructed that the opening can be regulated at the will of the inhabitant. Overhead is a circular register about 8in. in diameter, provided with radial openings covered by a revolving plate at will. Within the spandrels left between the plates supporting the upper deck and the deck itself, run two air trunks, one on either side; these extend from the furthest end of the men's berths—where they are within the ship—forward and aft to the boiler-room nearly amidships, passing from the inside of the shell to the outside about the place where the upper deck commences, or say at points distant by about 70ft. from the extreme ends of the ship. In the men's cabins these trunks assume the form of circular zinc pipes, pierced with small holes at intervals. Within the boiler-room, and just beneath the upper deck, is suspended, with its axis disposed fore and aft, a vertical fan 4ft. in diameter, driven by a donkey engine. The fan is of very simple construction; it consists of curved blades revolving within a case open at the periphery. The trunks all unite in a common branch, opening into the fan at its axis, and

the air drawn through them from the saloons and state rooms is thus scattered, so to speak, through the stokehole without producing local currents. The exhausting power of this fan is so great that when running at speed, say 900 revolutions per minute, a handkerchief is readily drawn into any one of the upper registers if held near it. The axis of the fan is supported in self-adjusting bearings carried by plate-iron hangers rivetted to the angle-irons overhead, and is driven by a single strap about 12in. wide, from a heavy pulley on the shaft of the donkey. This last is a vertical engine with a single cylinder, driving an overhead crank. Besides the fan, it puts a large plunger pump in motion, which can pump from any one of the compartments, or from the sea; into the boilers or on deck, as may be desired.

However excellent the workmanship or materials of a ship's hull may be originally, it is certain that after a time water will be found in the bilges which it is necessary to pump out. The arrangements for this purpose fitted on board Messrs. Winans' yacht are singularly complete. The ship is traversed from stem to stern by a bilge pipe, large enough to command a considerable leak, in communication with the donkey engine pump to which we have just alluded. Tins pipe runs close along the bottom of the ship, passing watertight through the bulkheads, and is fitted with faucet joints at frequent intervals, to provide for expansion or contraction. As many of the compartments are intended to act the part of coal bunkers, special arrangements are required to prevent the pump becoming choked with coal. To this end the pipe is covered throughout with a saddle strainer of plate iron, pierced with holes about three-sixteenths of an inch diameter; and over this is placed a kind of thin coarse matting, through which the water will percolate as fast as it can be removed by the pump. Within each compartment is a bilge valve-box of peculiar construction. It is fixed to the bulkhead nearest the boiler-room, and contains two puppet-valves, seating watertight on india-rubber. The arrangement of these valves is such that the water from the bilge rises through one valve seat and descends through the other. Normally, both valves are kept closed by a lever parallel to the bulkhead and taking up little room, and which carries a weight of about 50 lb. It is possible that sand or dirt getting under a single valve would prevent it from closing watertight upon its seat, therefore two are used; but if the two were fixed rigidly to a single lever, so long as one was held up the other could not close. Nothing would be gained, in short, under these conditions by the use of the second valve. In order to obviate this objection the valve spindles are jointed to a short cross lever, itself jointed to the weighted bar; whether one valve is then held up or not, the other will close independently, each valve acting as a fulcrum to the other—the action being much the same as in Ramsbottom's well-known safety-valve. The valves are of course nearly balanced, and they are therefore easily lifted or closed by a moderate force. Stout wires extend from the boiler-room to the levers in the different compartments. These wires terminate in convenient handles properly numbered. In order to pump out any compartment, it is only necessary to turn a handle throwing the bilge-pipe into communication with the donkey pump, and to pull down and fix the wire running to that particular valve-box. The valves will then lie opened, and the drainage will then proceed from that compartment only. It is clear that two or more bilge valves may be open at a time, according to the urgency of the occasion and the power of the pumping engine, which is not inconsiderable, worked as it is by steam of 150 lb. pressure. All the water thus pumped is of course thrown overboard, and we think our readers will agree with us in pronouncing the system to be planned with an ingenuity and forethought which, coupled as it is with first-class workmanship, should give the best results.

The steering apparatus differs in almost every respect from anything hitherto used at sea. The ship has two rudders fitted at opposite ends close to the screws. Our readers will get an accurate idea of these if they will picture to themselves two great spades with the handles thrust up through stuffing-boxes in the bottom of the ship, leaving the blades to project below. In other words, they are balanced rudders with a centre pin alone, taking its bearings above. Outside, there are only the wrought iron blades forged on to very heavy axes or rudder-heads of the best hammered iron. These rise, as we have said, through stuffing-boxes into the extreme compartments of the ship. They are then cranked on an easy sweep to miss the screw shaft, above which they each carry a horizontal cast-iron grooved wheel, about 3ft. 6in. in diameter, with a broad flange beneath. The weight of this wheel, and indeed of the entire rudder, is supported by a collar keyed on the shaft, resting on the gland of the stuffing-box. In this gland a groove is turned, into which a flange of the collar fits; and the groove being filled up with oil, now and then, perfect freedom of motion is obtained. Round the wheel is reeved a ¾in. chain, of the very best construction and material, which runs at either side of the compartment for about half its length. By hauling on this chain at either end, the wheel will be caused to make a portion of a revolution, limited in extent by the crank in the rudder-head coming against the main shaft, and the position of the rudder will be altered accordingly. This hauling is effected thus:—At each end of the chain a single block is fixed, through which passes the bight of the tiller chain. One end of each tiller chain, after passing through the block, is fixed to a ring bolt in the bulkhead. The tiller chains then run through pipes near the upper deck in the men's berths, over certain guide wheels, and thence through tubes to the steering wheel on, or rather above, the upper deck. This wheel is of brass, not much over 2ft. in diameter, supported apparently by the wood-work at the after side of the forward companion deck-house. The steersman stands on a platform raised a few feet above the deck, and supported by this house and the casing round the base of the forward funnel. He is thus able to keep a good look out over the top of the cook-house forward, and indeed over all obstructions, while he is himself well protected. The steering wheel shaft,

which is exceedingly short, carries on its forward end a pinion gearing into a spur-wheel both concealed within the pannelling of tile companion house. The spur-wheel is carried by a shaft projecting aft and revolving in very strong bearings. On it are fitted two chain pulleys over which the tiller chains pass, and the steersman thus gains a great purchase over the rudders, notwithstanding the small diameter of the wheel. In difficult channels both rudders will be used, the ship turning then as though on a pivot but at sea it is expected that one will be found sufficient for all practical purposes. The chain wheels carry at each end clutch boxes cast in one piece with them with a single slot cut across each. On the middle of the length of the shaft is a heavy boss resembling the clutch boxes doubled, and the framings at either end of the shaft are so shaped as to answer a somewhat similar purpose. The chain wheels do not slide on the shaft. In order to free either of them a key is withdrawn, one half of the thickness of which had entered the slot in the fast clutch on the shaft, while the other half entered that in the chain wheel. This last must previously be turned until the notch at its other end coincides with that in the framing. Into the space thus left the key is then slipped, and thus the chain wheel is freed from the steering gear and locked fast, with the rudder amidships. Precisely the same operation effects the same purpose with the other rudder. It will be understood from this that both rudders can be thrown into gear with the steering wheel, or neither, or either. They can also be left perfectly free, or locked amidships. The whole affair is disposed within an exceedingly small space, and although so much unlike anything to be seen on board other ships, the arrangement is very neat and mechanical.

So far the ship presents a succession of novelties, some of them remarkable enough; but the Ross Winans requires to be anchored as well as other ships, and the arrangements adopted for effecting this purpose are more original than anything we have yet spoken of. The peculiarities of her form render it impossible to use anchors of the ordinary construction. As there is no deck forward, catheads and hawse pipes are inapplicable. If fitted at the end of the existing upper deck it would be no easy matter to get an anchor over the projecting hull; and even though it were, the ship would always swing nearly broadside on to the sea unless she rode at two cables. Messrs. Winans therefore, abandoning old-fashioned plans, cut the Gordian knot by dropping their anchors through the ship's bottom; and reversing the ordinary rules, instead of being dropped from her bows they are dropped from her stern. We may here remark, *par parenthèse*, that although both ends of the yacht are the same, it is not intended that she shall steam either way indifferently, her engines being so constructed that the lead and cut-off of the valves will be wrong when the engines are reversed. This does not seriously detract from their efficiency it is true, but it affects the consumption of fuel to a considerable degree. Returning, then to the anchors, we have, in the sailors' berth aft, a windlass of very peculiar construction. It consists of two cheeks of plate iron rivetted above and below to suitable angle irons bolted to the skin of the ship. These cheeks are disposed in the plane of the vessel's axis, and they carry a cross shaft, on which are fitted a couple of powerful chain wheels, over which run two cables. The lower ends of these cables run into lockers below the main deck; the other ends, rising from the chain wheels, pass over guide rollers, just beneath the upper part of the hull—we cannot call it a deck, and we do not like the word roof—and thence down two wrought iron pipes just forward of the windlass, opening in the ship's bottom. These tubes are a foot or eighteen, inches in diameter, flared at the lower ends for a few inches. The anchors have neither stocks, shanks, nor flukes. They are simply two cylindrical masses of cast iron, each weighing about 30 cwt., provided with heavy rings or staples to take the cables at their upper ends, and flared out below to fit the lower ends of the vertical pipes. When hoisted, these cylinders enter the pipes as far as the flare will let them, and being accurately shaped, they then make an approximately water-tight joint, their ends being perfectly flush with the hull. The arrangement is, in short, almost identical with that of a Kingston valve. When lowered the cables run through the pipes, and the vessel is then held by the weight alone of the anchors. Whether this will or will not be sufficient, time alone can prove; Messrs. Winans regard it as being very much a question of length of cable. We decline to express any opinion, as we dislike criticising novelties until we have some basis of facts on which to rest our arguments. At the first glance it would seem as though nothing could have been easier than to substitute a good "mushroom" head for the flare actually adopted, but such a head would certainly bring up mud, and it would be impossible to render it flush with the shell in consequence. The windlass is so arranged that three different purchases can be had on the gear by simply shifting certain bevel wheels. Motion is imparted to it by means of a crank long enough to allow twelve men to lay hold, six on either side. This crank runs fore and aft in the berth right over the main shaft, and consequently the mess table, but by turning it to the right or left, the other side of the table is left clear; or it can be put into a vertical position, when, as sailors do not affect dish covers even on board yachts, it will not much interfere with their comfort. The bearings at the windlass end shift, in order that the purchase may be altered, and the plumber-block at the other end, bolted to the after bulkhead, is therefore filled with a brass bored out spherically in order to permit the required lateral motion.

Before quitting what we may term the nautical section of the subject, we may call attention to the boat-lowering arrangements. The Ross Winans will carry four large boats, two on either side. As the hull is some 14ft. in diameter where the davits are fitted, while the deck is not more than 9ft. 6in. wide, it is obvious that a projection of over two feet on each side prevents the boats from being dropped vertically into the water in a line with the bull-warks. The davits, therefore, instead of rotating on the ordinary plan, which takes up much room, are made

* The shell of the ship is lined with zinc from the floor all round to exclude dump, a space of a couple of inches intervening which is effectually ventilated by means which will be understood presently. The state rooms and bulkheads are similarly protected from "weeping," and this lining has been worked with much elegance to the curves of the after bulkheads, and has been so arranged and painted that it is difficult to distinguish it from bird's-eye maple panelling.

† The fore saloon is similarly fitted to accommodate twelve persons.

derrick fashion, to fall in and out from the ship's side. Each davit consists of two stout bars of round iron welded together at the upper, but spreading at the lower ends to a distance of a couple of feet. One leg carries a universal joint consisting of a swivel pin bolted to the ship's side ; while the other is also fitted with a somewhat similar joint, the swivel pin being fixed not directly to the ship's side, but to a block running on a slide about a foot long. Strong chains are fitted to the davits to support them while a boat is being raised or lowered. The boats are double ended, and carry in each cut-water end a strong eye. When raised these eyes enter jaws in the davits, and a couple of pins being passed through the boats are secured. When the weather is rough, by raising the davits to a vertical position, the boats are turned up on the gunwales presenting their keels to the sea and thus affording considerable shelter for the decks. The sliding joints at the base of the davits permit them to be shifted at their upper ends in a fore and aft direction to adapt them to slight differences in the length of a boat, and to permit the boat to pass between them when it is deemed desirable to bring her fairly on board.

Thus far we have written almost solely of the ship alone. We have yet to consider the means by which she is to be propelled—her machinery and boilers in fact. These deserve, in the fullest sense of the word, a paper to themselves representing as they do novel arrangements at almost every turn ; arrangements the necessity for which is almost accounted for by the fact that the engines are to be worked at a pressure—150 lb.—never before attempted at sea as far as we are aware.
