Scouts the armament will consist (1) of 6 in. guns mounted on the Vavasseur principle, with elaborate cylindrical supports; (2) of eight machine guns; and (3) of eight torpedo tubes—one each at bow and stern and three along each side. As the armament is comparatively small, so the magazines are fairly simple, though at the same time they involve considerable care in their arrangement.

At this point we ought to add a remark or two in regard to the machinery of the new Scouts. It will be increased from 3,200 to 3,500 indicated horse-power. Several minor modifications will be introduced, which will, with the increased power, add about 12 per cent. to the cost of the machinery. Instead of consisting of one compartment, as in the Scout now in hand, the engine-room will be in two parts separated from each other by a water-tight bulkhead. This will add to the efficiency of the ships, but it will also add greatly to the weight and cost both of the hull and the machinery.

The hulls of the new Scouts will show an improvement on the appearance of the first Scout, inasmuch as they will each be provided with a removable clipper stem; and the stern will be like that of an ordinary merchant ship. The sail power will be very much increased, and a bowsprit will be added, and there will be three masts, whereas the vessel now in hand has a light schooner rig. The quarters of the officers and crew are in the poop and forecastle, and though somewhat small, they are well arranged.—*Eng.*

BUTLER'S MOVABLE STAITHS.

The coal-tipping staiths designed and patented by Mr. Samuel Butler, of Cardiff, are represented by drawings and photographs, a copy of one of which we give. Staiths have hitherto been fixed and the ships moved. This invention provides for moving the staiths and keeping the ship stationary. The object to be gained by this is to enable three staiths to be loading a ship at the same time, instead of one only, an alteration which is calculated to increase the rate of loading five times effecting a great saving in quay space as well as in the time of the ship. In its most elementary form the wagons are run on to a traversing carriage and moved sideways into the staith. They are then tipped by a hydraulic cylinder into the shute, and the contents are received in an anti-breakage box and lowered into the vessel. This box is operated by chains and a balance weight. In Figs. 1 and 2, another method of operating the box is shown.

The bottom of the shute, for about 3 ft. from its end, is made to lift on a rocking shaft beneath it (Fig. 2), actuated by side levers, to which it is connected by rods. The mouth of the shute is thus balanced by weights, at the back of the staith, which are attached by chains to the ends of the side levers. There are three chains working the anti-breakage box, and these may be locked between small rollers in the bar connecting the two side levers. The object of the three chains is to open and shut the doors, as well to keep the box square with the shute. The centre chain of these three is attached to a cross bar, which in its turn is connected by chains to the doors. The two outside chains are connected to another cross bar, which in its turn is connected to the box. The box is lifted and lowered by the chain attached to the doors, worked by the hydraulic cylinder. The chains attached to the box are kept tight by their weight, and only come into action for discharging the box, this being brought about by large links in the chains coming in contact with an adjustable stop. The depth at which the box is to discharged is determined by the position of this stop, which can be set on a rack at any point along the floor of the staith. The action of the box therefore is to open the mouth of the shute on coming up to be filled, and to close it immediately it begins to descend. The box may be made to hold one to two tons, and is automatic in filling and discharging.

The illustrations show a staith designed for shipment from low-level railways. The wagon is lifted by a hydraulic cylinder, which is carried between two upright girders. There are four flat wire ropes attached to the cylinder, passing over top and bottom pulleys, and thence over an upper pulley; from this two ropes lead down to one side of the cradle, and the remaining two ropes pass over the opposite pulley, and down to the other side of the cradle. The staiths may be constructed to discharge wagons from their ends or bottoms (Figs. 3 and 4). The action of the lift is used to pull the staith to its position. The only additional appliance required for this purpose is a chain passing over the top of the staith, to which the cradle may be attached on either side; if it be attached to one side the staith is drawn in that direction, if it be attached to the other side it is drawn in the opposite direction. Each end of this chain is fastened to mooring posts on the quay at opposite ends of the staith's path.—*Eng.*

RAILWAY APPLIANCES AT THE INVENTIONS EXHIBITION.

Railway Signalling Apparatus.

We give illustrations of a new arrangement comprising the union of the block and interlocking systems, which is exhibited by Messrs. Saxby and Farmer, of Kilburn. Fig. 1 is a side elevation in section, Fig. 2 a front elevation, Fig. 3 a section of the treadle, and Fig. 4 a plan of the treadle, contact, which acts by the deflection of the rail. These illustrations show a machine in which is contained an interlocking apparatus of seven levers for working points and signals and two improved block telegraph instruments for the exchange of train telegraph signals, with the stations on either side for up and down lines respectively. The locking handles are attached to hollow spindles in the centre of which are the spring commutator plungers. When the handles are moved to the right, which is the "line clear" position, they work gear which interlocks the point and signal levers in any manner necessary to the traffic. When the handles are moved back to the "line blocked" position they are stopped in midstroke and become firmly locked and they cannot be moved again to the "line clear" position, neither can they be placed in the position to unlock the point and signal levers until the train has passed over the treadle apparatus shown in Figs. 3 and 4. The treadle is worked by the weight of the train deflecting the rail and pressing down the short arm of a lever which is pivotted in a cast-iron box fixed to the sleepers as shown. As this short end of the lever descends the long end rises and completes the electrical circuit. A current of electricity is sent through the magnet of the block instrument and unlocks the handle, which can then either be restored to its normal position to unlock the point and signal levers, or it can be moved to the right for the "line clear."

As the handles of the block instrument and the point and signal levers are combined in the same interlocking mechanism they cannot be manipulated in a contradictory manner. Only one wire is used for the signals and bells of both up and down lines. It is claimed for the treadle described that it gets rid of the difficulties usually experienced with treadles acted upon by passing trains. The short end of the lever is always in contact with the underside of the rail, and owing to the proportions of the arms, a very slight deflection in the rail gives sufficient movement for insuring electrical contact. The wear and tear are reduced to a minimum, and the liability to get out of order through violent blows from passing trains are obviated. When it is remembered, as Messrs. Saxby and Farmer point out, that both in the block and interlocking systems, the safety of railway traffic depends on the correct working of the out-door signals, the securing of accuracy in this direction is a point of the first importance.

In Figs. 5 to 12, we illustrate Messrs. Saxby and Farmer's "duplex detector," a new facing point lock which is designed to obviate danger from the failure of any of the connecting rods between a set of points and the locking apparatus in the signalman's cabin. In the ordinary arrangement should a connecting-rod break, the point lever can be shifted without moving the points themselves, but the signal would be altered and would therefore indicate that the points would be standing in a contrary direction to that which they really occupied. The detector lock is intended to guard against this danger. It consists of a double-action plunger which can be pulled when the points stand in one direction, and pushed, when they stand in the other, in a hole in the tie-bar between the tongues of the points. In this way if the points have not been moved as intended, the signalman is warned and is unable to give the signal contrary to the direction in which the points would be actually standing. In our illustrations, Fig. 5 is a plan of the general arrangements, Fig. 6 is a section, Figs. 7 and 8 show the duplex stretcher bars through which the detector bolt slides together with the duplex stretcher bar, Fig. 10 is a section through the cabin, and Figs. 11 and 12 details of reversing gear.—*Eng.*

In the consumption of soap per capital the United State lead. Italy is last on the list.