A NEW ELECTRICAL STEERING GEAR.

BY OUR ENGLISH CORRESPONDENT.

A few weeks ago we drew attention in the SCIENTIFIC AMERICAN to a new electrical steering gear that had been devised by the Earl of Crawford, and had been subjected to several experiments upon his yacht "Valhalla" in the Solent. The results of these experiments established the efficiency of the apparatus, and its value when employed under certain conditions, but it possessed several inherent imperfections, which have now been remedied. An experimental installation has been made, and is now in operation at the works of Messrs. Siemens and Halske, of London.

In design, this steering gear is very similar to the type usually fitted on large yachts for hand steering, and has been only slightly altered so as to adapt it for electrical driving.

It consists essentially of a solid cast-iron frame bolted to the deck. The upper end of the rudder-post passes through the base of the frame, and carries, securely keyed to it, a massive cross piece. Above this, and running fore and aft, is a right and left handed screw supported in the frame and carrying one right and one left-handed nut, which are supported and prevented from turning by two guides running parallel with the screw. These nuts are connected by links, one to each side of the cross piece on the rudder post, and by this means the turning of the screw operates the rudder. The steering wheel is sufficiently large to be used in the case of an emergency, for hand steering, and it is carried on a sleeve on an extension of the screw, with which it can be connected by means of a claw clutch.

A Siemens four-pole completely inclosed motor is arranged so as to drive the screw through several reductions of spur gearing, and through a claw clutch. This latter is connected with that on the steering wheel, in such a manner that both are operated by one lever, and only one can be in gear at a time. From this it will be seen that the screw, which operates the rudder through the nuts and links, is capable of being turned either by the electric motor or by the steering wheel, but not by both simultaneously.

The electric motor is series wound and is provided with a brake, pulley, and brake blocks, which are held off by an electromagnet, in series with the motor and held on by a suitable spring. The brake is therefore applied, and the motor is thus promptly pulled up whenever the current is interrupted.

The motor is controlled by two special starting switches, one for each direction of rotation, instead of using a single reversing switch, as by this arrangement it is possible to obtain an absolutely trustworthy and quick brake action.

Each switch has three contacts, so that resistance can be cut out in two steps, and the contacts are so shaped that the actual contact surfaces are not touched by the arcs, and therefore remain in good condition. Each contact is reversible, and can be easily and expeditiously renewed in a few minutes. A powerful magnetic blowout is provided on each switch, which is in operation on all the contacts.

Although the potential of the requisite current is so very low, being not more than 25 amperes at 100 volts, these ample precautions against arcking troubles have been taken, owing to the sudden and frequent switching on and off, which is required in the ordinary steering of a ship. They have proved quite satisfactory in practice.

The operation of the starting switches is accomplished as follows: The two switch arms are mounted on two pins on a metal disk and at equal distances from its center. The disk is geared to the screw, and its motion is therefore proportional to that of the rudder. The switches have cranked arms, as shown in the drawing, which can be pushed so as to put the switches on or off, by stops, on a second disk mounted concentrically with the first.

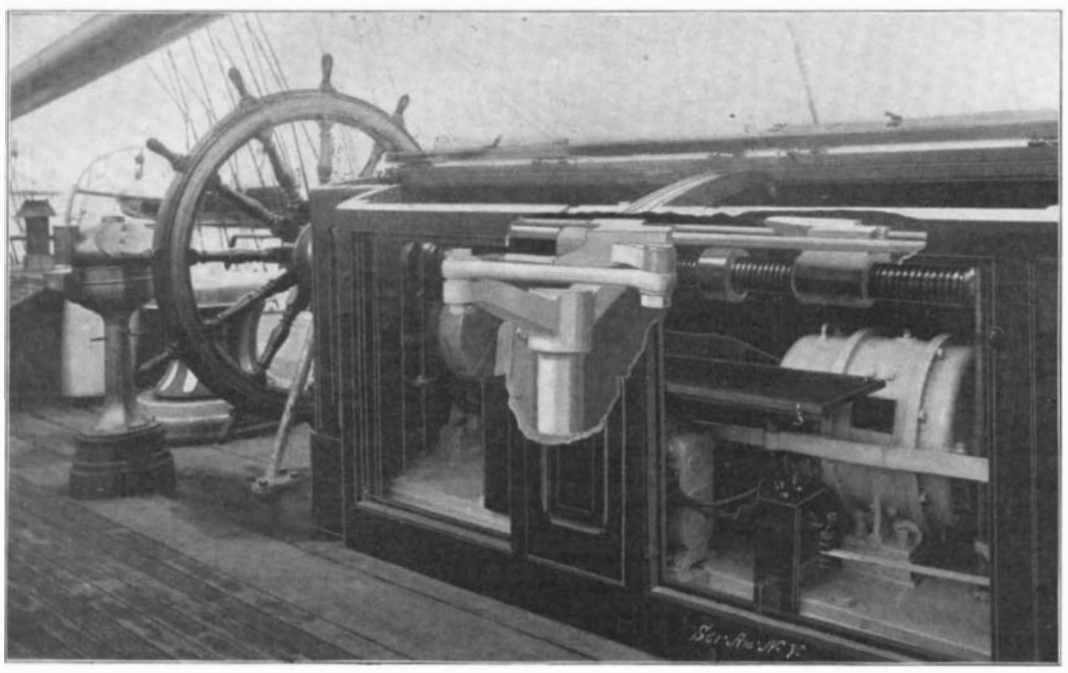
The second disk is in gear with the steering wheel, and its motion is therefore proportional thereto. The switching on or off is consequently the result of the difference in the motions of the two disks, which are proportional to that of the rudder and the steering wheel respectively.

The cranked arm of each switch is so shaped that it clears the stops on the second disk when the motion is in one direction, but engages them when the motion is in the opposite direction. This insures that one switch only is operative in each direction of rotation.

Both switches are pulled to the off position by springs so as to get a quick break, but they are also pushed off positively by the stops, so that the breaking of a spring does not incapacitate the gear in any way, but only makes the brake rather slower. The disks are further provided with massive stops arranged to limit the difference of their motion to little more than the amount actually required to operate the switches.

The gearing is such that twelve complete turns of the steering wheel move the rudder from hard a-port to hard a-starboard—a total angular distance of 80 degrees. A Geneva stop is provided on the second switch disk, which prevents the steering wheel from turning more than twelve complete revolutions. When the Geneva stop is reached, the second disk is stopped and the first catches it up, so that the motor is automatically switched off when the extreme positions of the rudder are reached.

The trials which have taken place on the "Valhalla" have been attended with complete success, and the control of the ship was as perfect as could be desired, and gave complete satisfaction to the navigating officers. The test imposed by them, which was considered the most severe, namely, throwing the rudder from hard a-port to hard a-starboard while steaming at full speed astern, was accomplished with ease and without excessive consumption of current.



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RECENTLY PATENTED INVENTIONS.

Agricultural Implements.

DITCHING-PLOW.—B. D. LEMERT, Fort Morgan, Col. This apparatus clears weeds and other obstructions from both field and head laterals of irrigating-ditches, and makes new irrigating-ditches; it obviates rocking or "side flopping"; it provides means for raising the plow clear in order to transport the device or turn the plow around; means for changing the width of the machine for ditches of varying widths, and for adjusting for deep or shallow ditches; and means for running the axle freely and easily in the boxes.

Engineering Improvements.

MARINE-ENGINE GOVERNOR.—P. V. CORNILS, Seattle, Wash. This new and improved governor is controlled by the pressure of the water on the sides of a vessel to insure a proper cut-off of the steam and a consequent reduction of the speed of the propeller and decrease in the vessel's momentum at the time the low water reaches the propeller, so that the latter is prevented from racing.

ROTARY ENGINE.—H. M. HJERMSTAD and E. O. SOHN, Hader, Minn. The engine has an eccentrically-mounted piston carrying wings or piston heads which run on a concentric guide and there thereby caused to move in and out relatively to the piston as the piston turns. The steam is passed through the cylinder in a continuous stream, thereby to act by impact on the wings or piston-heads and impart a continuous rotary movement to the piston and its shaft.

GAS-ENGINE.—W. J. MCVICKER, Rogers, Neb. The engine in this invention belongs to explosive-engines of the four-cycle compression type; and the object of the improvement is the provision of a new gas-engine which is simple and durable in construction, effective in operation, and arranged to utilize the exhaust-pressure for actuating the exhaust-valve.

Mechanical Devices.

ROTARY STRAINER.—C. EDGERTON, Philadelphia, Pa. The special design of this invention is a device for removing the oil or grease which rises from garbage, meat scraps, etc., while being cooked. It is applicable to many analogous uses. The improvement consists of a perforated chamber strainer combined with means for rotating it and a scraper for scraping the surface of the chamber while rotating, so as to clear the holes of all materials. Means are supplied for supporting and turning the strainer, and taking off the liquid which passes through the rotary strainer.

TREAD-POWER MOTOR.—E. PARKER, Cumberland, Iowa. This mechanism is arranged to permit of conveniently changing the inclination of the tread-wheel to utilize the animal's power to the fullest advantage for various kinds of work without requiring undue exertion to run the motor powerfully at a slow speed or with less power at high speed.

MACHINERY FOR ROLLING SHEET OR OTHER METAL STRIPS OR BARS OF CURVED OR OTHER SECTION.—G. B. JOHNSON, 8 Victoria Street, Westminster, London, England. Mr. Johnson's invention relates to machinery for longitudinally corrugating or fluting sheet-metal strips; and the object is to substitute for the operations of stamping in dies a series of progressive continuous cold-rolling operations, whereby the metal is brought at a single pass through the series of sets of rolls from the form of a flat strip to that of the longitudinally-corrugated reversely-curved section required.

BORING AND REAMING MACHINE.—G. A. ENSIGN, Defiance, Ohio. Provision is made in this invention for a machine arranged to permit convenient, quick, and accurate shifting of the work-holder, to allow of first boring the work and then reaming it without removing the work from the work-holder, thus insuring the formation of an accurate hole.

FOLDING-MACHINE.—L. E. ELSON, New York, N. Y. In this case the invention has reference to folding machines particularly adapted for folding fan-tops or other blanks having a segmental form. Folding of this character is usualy done by handwork which is a slow process, not always resulting in even folds or plaits. By means of the machine the folds may be evenly and quickly made, with a resulting reduction in the cost of manufacture.

MACHINE FOR FASTENING FAN-STICKS TO FAN-TOPS.—L. E. ELSON, New York, N. Y. The machine provided by this invention has a very simple construction and is adapted to fasten fan-sticks to folding fan-tops in a very expeditious manner. By the simple manipulation of a plunger-plate, the fan-top, on which an adhesive has been spread, is passed under the fan-sticks and automatically clamped against them, thus practically completing the formation of the fan.

Medical Devices.

RECTAL OR VAGINAL SPECULUM.—O. H. KOHLHAAS, Calumet, Mich. The speculum has a skeleton frame made preferably in two longitudinal jaws, separable or adjustable for dilating the passage in which the instrument is inserted. Means are provided whereby the rectal or vaginal passage may be illuminated for surgical operation, also devices for grasping inflamed or diseased tissue and morbid growths requiring treatment, and devices for cauterizing such parts by aid of a galvanic current.

CLINICAL THERMOMETER.—O. G. BELL, Norwich, N. Y. The intention of this improvement is to furnish a new clinical thermometer arranged to protect the glass casing against breakage at both ends and to allow of convenient filling of the casing with an antiseptic solution in which the instrument is held immersed when inserted in and secured to the casing.

Vehicles and Their Accessories.

SIDE-DUMPING BODY FOR VEHICLES.—W. L. CHESSROWN, Eaton, Col. The purpose in the present case is to provide a side dump wherein the dumping will be automatically accomplished the moment that supports beneath the body are withdrawn, which is done by a single movement of a single lever, and, further, to so construct the body that as it is restored to its normal position the side gate opened for dumping will be automatically closed. The body or rack may be used on any wagon-gear, and is adapted for hauling sugar beets, and for all farm purposes and upon any hauling or dumping vehicle, including railroad cars.

Miscellaneous.

WASHBOARD. — CATHERINE HARDWICK, New York, N. Y. The purpose of the inventor is to so construct a washboard that it may be adapted to any form of tub and lie therein in such manner, as not to materially interfere with the clothes to be washed and so that the board may be operated upon in the most convenient manner and be strongly braced.

GATE.—A. C. HUNT, Naco, Arizona Ter. The improvement provided by Mr. Hunt's invention relates to a gate constructed principally of wire and connected with a swinging frame which holds the wires distended and which has attached to its free portion a device for engaging the post and stretching the wires taut in connection therewith.

METALLIC PACKING.—W. G. WATSON, Ogden, Utah. The object in view in this invention is to provide a new and improved metallic packing which is simple and durable in construction, effective in operation, and arranged to positively prevent leakage and undue wear on the piston-rod, valve-stem, or other movable part on which the packing is used.

STAIR-ROD AND FASTENING THEREFOR.—I. V. MEAD and J. W. GIBSON, New York, N. Y. Provided by this invention is a construction of stair-rods and fastening devices therefor, so that the rods and their fasteners will be concealed by the carpet which the rods serve to hold in position where the steps and risers of a staircase meet. The device is capable of firmly holding the carpet in place without injuring it and of being conveniently reached when the carpet is to be secured to or removed from the stairs.

SHOE-POLISHING STAND.—R. G. POLSON, Leadville, Col. During the polishing operation this device firmly holds a boot or shoe in place. It is adapted for use in the household, as well as in barber-shops, hotels and other places. Means are provided for raising or lowering and changing the angle of accommodation of the shoe rest; also means for clamping soles and heels on boots and shoes of different sizes.

FASTENING DEVICE FOR FURNITURE.—W. E. NELSON, New York, N. Y. This device secures the upper structure of chiffonniers, bureaus, and the like to the top slab or board of the body of the article in such manner that the locking device will be invisible from the front or sides and may be quickly brought into and out of action. The device will firmly hold the superstructure to the base, and admit of the superstructure being readily removed from the base.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.