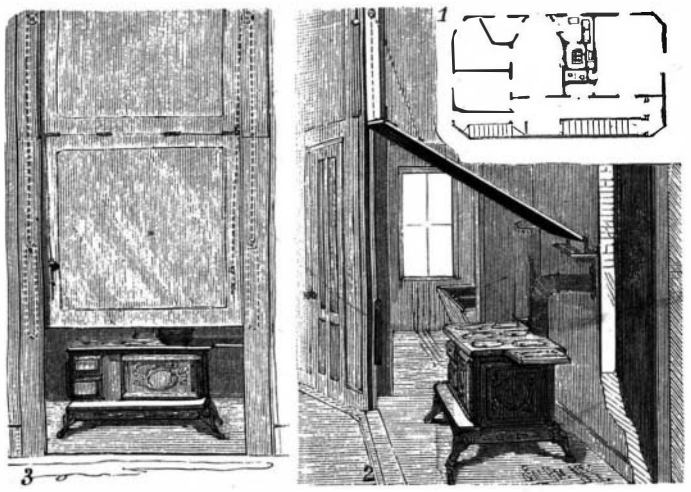
IMPROVED TENEMENT CONSTRUCTION.

The illustration represents improvements in house construction designed to economize both material and room, and especially affording a novel arrangement of combined dining room and kitchen, for which a patent has been issued to Mr. Samuel Sanderson, of No. 308 Crescent Street, Waltham, Mass. As shown in the small plan view, Fig. 1, a private hall extends nearly the full depth of the house, to which leads a small public hall at the back, the stairways at one side. At the front is a sitting room or parlor connected by a passageway with a combined dining room and kitchen, back of which are two bedrooms, while at one side is a pantry. At one side of the combined dining room and kitchen is a sink room, in which is a double wash tub, with removable partition, to facilitate its use as a bath tub, and adjacent thereto is an alcove room, accommodating a stove or range. The latter

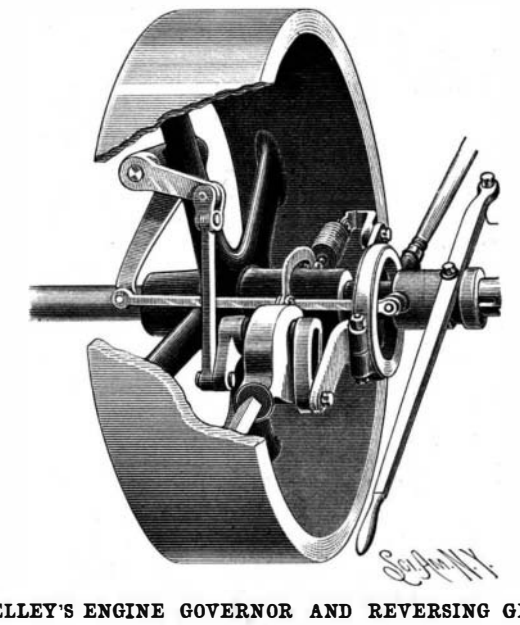


AMERICAN LABORER'S HOME—THE WALTHAM TENEMENT.

room is cut off from the dining room by a partition consisting of a fixed top portion, below which is a movable section or screen formed of two hinged parts, as shown in different positions in Figs. 2 and 3, but normally hanging in alignment. These screens move in vertical guideways, portions of which are cut away to allow the bottom member to swing in, as shown in Fig. 2, when the screen is raised, the swinging section then being engaged by a stop on the mantel. The movable screen or partition is suspended from weighted cords, the weights moving in vertical pockets at each side of the partition. One chimney serves for the front and middle rooms, and adjacent to the chimney is the hot water boiler. At the side of the passageway opposite the stove alcove is a small room for use as a wash room and water closet.

A STEAM ENGINE GOVERNOR AND REVERSING GEAR.

According to this improvement, both the governor and the reversing lever fully control a single-pivoted eccentric, carried around at its pivot by the driving shaft, and connected in the usual manner with the engine valve. The invention has been patented by Mr. Harry H. Kelley, of Elyria, Ohio. On the shaft is a wheel having on its inner surface a radial guideway, on which slides a weight connected at its inner end by a slotted link with a spring attached to the opposite inner surface of the wheel rim. In the weight is a



KELLEY'S ENGINE GOVERNOR AND REVERSING GEAR.

transverse shaft, on the front end of which is a link with a curved slot engaged by a friction roller on an arm forming part of the inner face of an eccentric, in the form of a ring, through which loosely passes the main driving shaft. The eccentric is rigidly held on an arm pivoted to a bracket extending from the opposite inner face of the wheel, and the eccentric is connected by the usual straps and rod with the valve of the engine. As the weight slides outwardly with the increased speed of the engine, the link is shifted and the eccentric is moved relatively to the shaft to cause the valve to cut off sooner. Provision is also made to shift the link independently of the movement of the slidable weight by means of the reversing lever shown at the right in the illustration. The rear end of the transverse shaft journaled in the weight carries a crank arm pivotally connected by a link with one arm of a bell-crank lever fulcrumed on one of the spokes of the wheel, and the other arm of this lever is connected by a link with a sleeve sliding on and turning with the shaft, this sleeve being engaged by the reversing lever, whereby the movement of the eccentric may be reversed, and consequently that of the valve controlling the supply of steam to the cylinder. The governor and the reversing lever fully control the eccentric, and at the same time the governor and the lever can independently shift the eccentric to control the valve, the reversing of the engine being effected by moving the eccentric across the shaft.

BERSIER'S STEERING COMPASS.

The traditional order, "Don't Talk to the Pilot," that some of our readers have seen posted up on steamers, is upon the point of becoming useless, thanks to a very recent invention of one of our most distinguished naval officers, Lieutenant Bersier. This invention is called the steering compass.

This instrument, in fact, permits of dispensing with the man at the wheel. It is the compass that, in this system, directly actuates the rudder, so as to keep the ship in the proper direction.

Did the use of this new apparatus present no other advantage than the doing away with the pilot, the result, although original and curious, would be relatively of slight importance. But the special merit of this method of steering is the great precision that results from it, thanks to the substitution of the most absolute automatism for the action of the brain of man, which sometimes becomes weary or distracted.

The problem of the automatic steering of ships has often been proposed, since it is an attractive one; but the difficulty in the way of its solution has been the necessity of giving the very delicate and sensitive rose of the new compasses its full liberty, while at the same time utilizing the elementary rotations of the sides of its box with respect to the rose, that is to say, the lurches of the ship, in order to correct such lurches by means of the rudder. In order to govern this part, then, it was impossible to think of utilizing the steering power of the rose; in a word, the latter could not be touched. It is this that explains the want of success of all the tentatives made up to the present to devise warning compasses, that is to say, compasses to signal the deviations of a ship to a distance. In such instruments, a magnetized needle was flanked by two stops forming electric contacts against which it struck, in becoming disturbed, however, in most cases.

As our readers well know, a mariner's compass consists of a glass-covered cylindrical box suspended in gimbals in what is called a binnacle. At the center of the bottom of the box rises a rod that carries an iridium pivot. A light paper disk slit upon an aluminum circle carries eight parallel magnetized needles. Such is the card or rose, which weighs 375 grains, at the most, in the large models. Its circumference is graduated in degrees from 0 to 90 in each quadrant, starting from the north and west points, on the one hand, up to the east and west points on the other. At its center there is a sapphire which rests upon the point of the pivot. The position of the needles below the disk, to which they are attached by silk threads, assures the horizontality of the rose. The feeble magnetic momentum that so light a rose may have prevents, as may be seen, any stress being exerted upon it under the penalty of disturbing it completely.

Lieutenant Bersier, as long ago as the year 1888, thought of employing the electric spark of the Ruhmkorff coil to unite a point of the circumference of the rose and two semicircular plates insulated electrically from each other and the sides of the box that they covered. Some studies successively carried on upon a torpedo boat and a large cruiser were arrested at this epoch by the absence of electric wiring upon many ships. The operation of the coil, in fact, can be practically assured only by a small derivation from a dynamo to the exclusion of electric batteries. Things are now much changed. Upon all modern ships, a few amperes are as easily taken from a general circuit conductor as water is from a cock. So the steering compass will be henceforth easy to install. It operates as follows: In a room located at a few yards distance from the best compass on board is placed a Ruhmkorff coil supplied by a mean current of from 2 to 3 amperes. The induced current of this coil, through a flexible wire, reaches the pivot of the compass, whence it jumps to the aluminum capsule that carries the sapphire, and follows an aluminum wire, forming a radius of the north pole of the rose (Fig. 1).

According as the ship is to the right or left of its course, the current leaps in a spark of about an inch from the north point to the right hand or left hand plate of the box and flows, at a few yards therefrom, into one or the other of two electro-magnets, which close

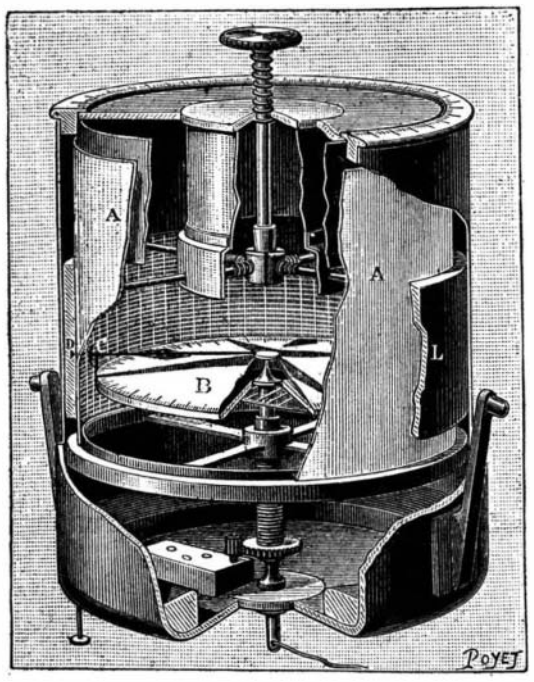


Fig. 1.—GENERAL VIEW OF THE STEERING COMPASS.

AA, band of paper upon which the variations in the route of the ship are inscribed; B, rose; C, bridge of fibrine placed at the north point of the rose; D, circle of metal divided into segments corresponding to the signals; L, cylindrical ebonite guide of the band of paper.

the circuit of a small 150 watts motor, in order to cause it to revolve to the left or to the right. The shaft of this motor is keyed upon that of the rudder motor. One merely replaces here the muscular strength of the pilot without in anywise changing the already existing parts of the ship. This installation is therefore simple and inexpensive (Fig. 3). The box of this compass has been under trial for two months in a squadron and the experiments have proved a perfect success.

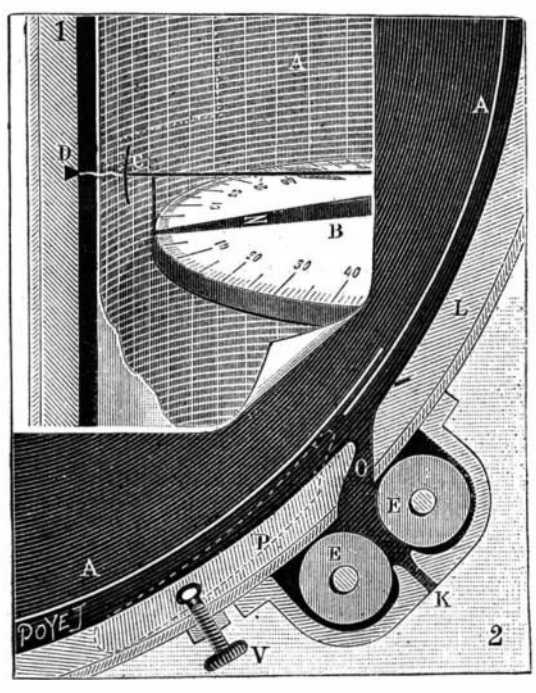


Fig. 2.—EXPLANATORY DETAILS.

A, band of paper; B, rose; C, fibrine bridge; D, circle of metallic pieces set into ebonite and each corresponding to a signal; L, paper guide; O, slit for the introduction of the paper; EE, rubber rollers for the introduction of the band of paper; V, regulating screw.

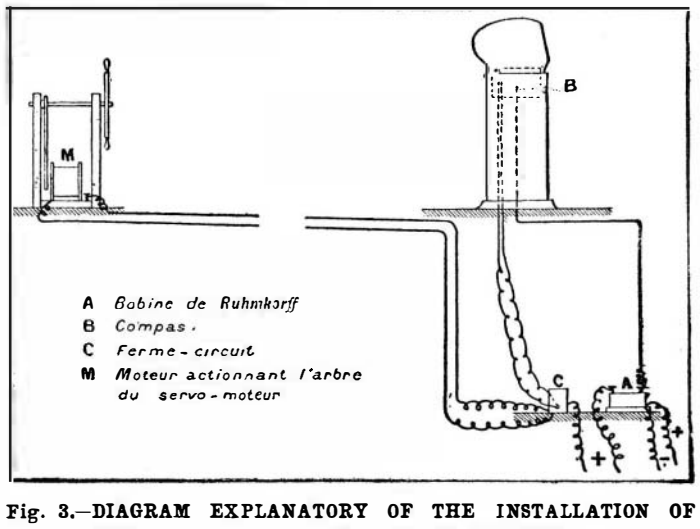


Fig. 3.—DIAGRAM EXPLANATORY OF THE INSTALLATION OF THE REGISTERING COMPASS ON SHIPBOARD.