

A Typewriter That Copies With Its Own Eye

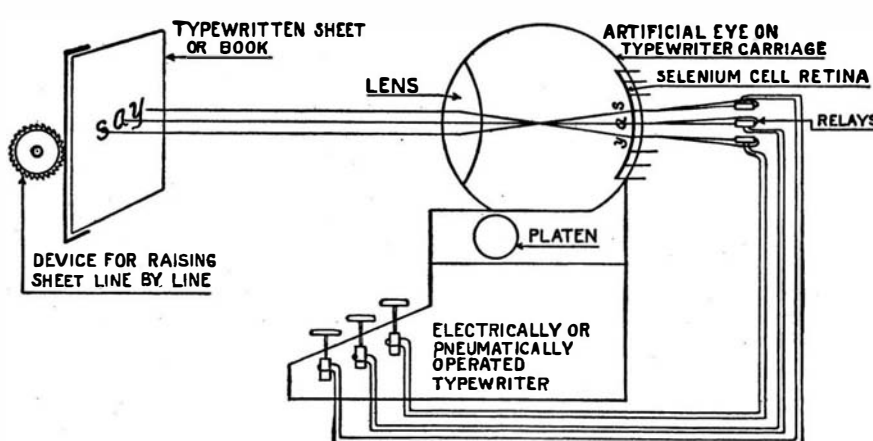
DESPITE the fact that the self-operated typewriter described in the following paragraphs has not as yet been actually constructed and tried out, not a little interest attaches to it for the suggestion it offers. Provided with a huge mechanical eye, this typewriter of the future will be capable of copying automatically any reading matter that may be placed in front of it.

The typewriter that copies with its own eye is the idea of J. B. Flower, an electrical engineer of Brooklyn whose name is not an unfamiliar one to the readers of this journal. The artificial eye is preferably attached to the carriage of the typewriter in order that it may move at the same rate of speed. It moves, step by step, over the line of printed or typewritten language appearing on a sheet of paper which is placed in front of the machine.

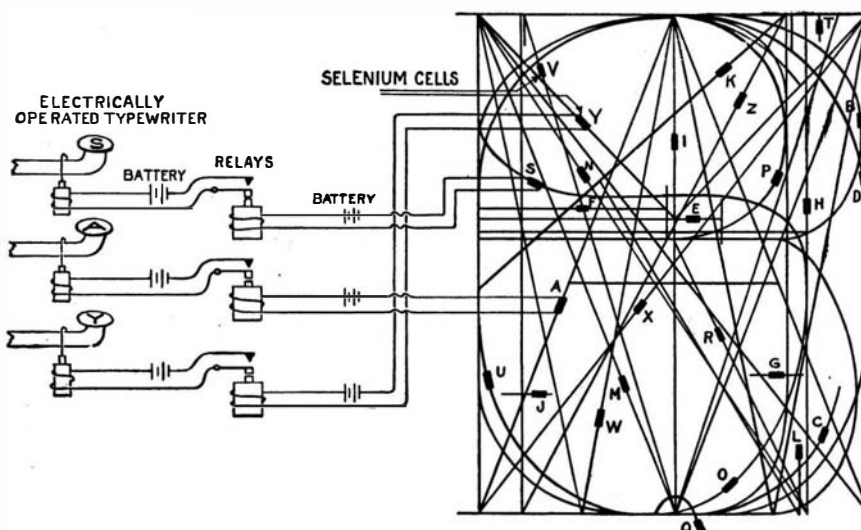
The artificial eye of the automatic typewriter must of necessity be of complicated construction. Essentially, it comprises a lens and a number of selenium cells arranged so as to form a retina similar to that of the human eye. The sheet of paper containing the copy to be duplicated is placed at a suitable distance from the artificial eye, so that a clear image of the letters will be produced on the multiple selenium cell retina. It is imperative that the eye move parallel to the read letters in order not to ruin the focus. The principle followed in connecting the selenium cells (low resistance cells) is that all the letters falling on the retina must be superimposed in one position; then the point or points in any one letter form which do not correspond to those of another letter form are the point or points which stand for that letter. These points can be connected to the typewriter for operating that particular letter form or character without chance of interfering.

The method of operating the new typewriter is to place the typewritten sheet or book of which it is desired to make a copy in a special stand or device for raising the sheet line by line. The sheet is now held in a vertical plane parallel to that of the selenium cell retina. For the sake of exposing the operation of the mechanism, it is assumed that the word being copied is "say." Upon starting the typewriter by turning on the electric current, the image of the letter "s" will appear on the selenium cell retina and its shadow will stand over the selenium cell marked S and no other, hence the current passing through it will decrease in amount allowing the relay armature to move, thus closing the local circuit and actuating an electromagnet which in turn operates the "s" typebar of the typewriter and prints the desired character on the paper. The carriage now automatically shifts the artificial eye over one letter space, with the result that the image of the letter "a" now appears on the selenium cell retina and its shadow stands over the selenium cell marked A and no other, thus causing the typing of the letter "a." Following the same procedure, the letter "y" is typewritten. For spacing, the typewriter is provided with a mechanism which, when the carriage moves over one letter space and no type key is operated, the space lever is brought into operation. Means are also provided for automatic line spacing, carriage return, paper insertion and removal, and other phases of typewriter operation.

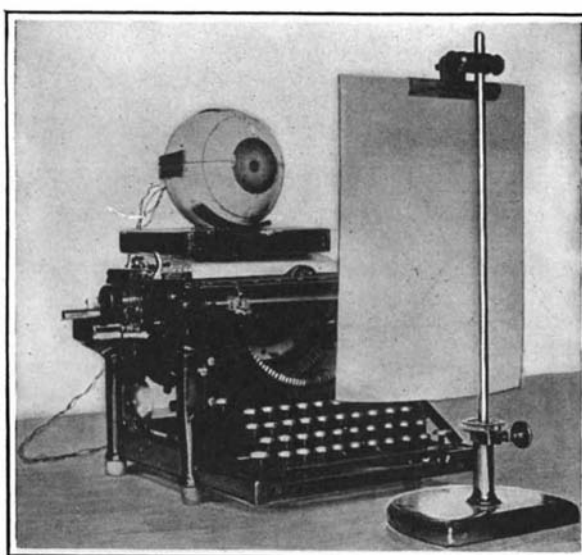
As previously stated, the reading typewriter is based on the principle that when the standard letters of the alphabet are superposed one on top of the other, there will always be one point in each letter form which is not com-



Diagrammatic scheme of the main components and their relationship in the self-operated typewriter



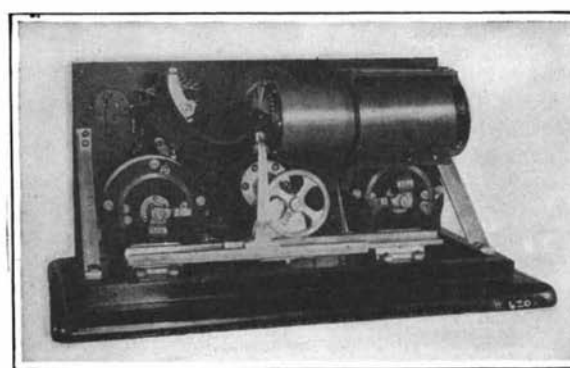
Arrangement of the selenium cells which form the retina of the typewriter eye



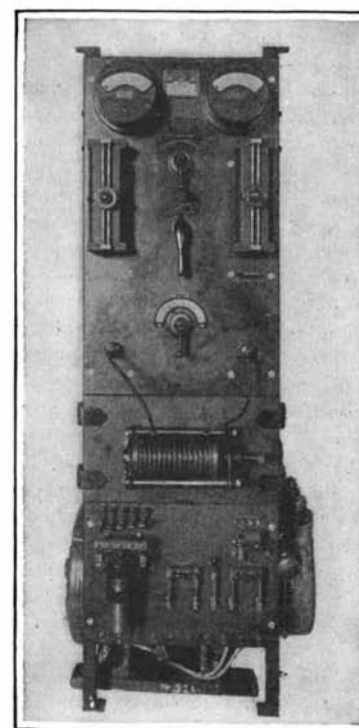
The typewriter that writes what it sees with its own eye
THE READING TYPEWRITER



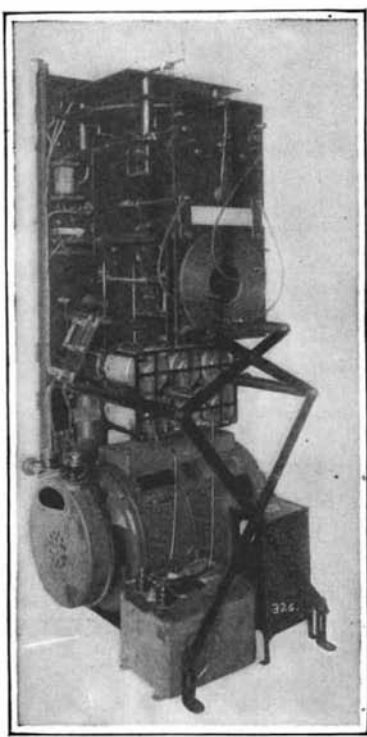
Front view of the cabinet receiving set



Rear view of the cabinet receiving set



Front view of the transmitter



Rear view of the transmitter

TRANSMITTER AND RECEIVING SET OF UNIT DESIGN FOR USE ON SHIPBOARD

mon to any other letter form. On typing the alphabet on the typewriter with all the letters superposed, it will seem at first that the statement just made is incorrect. The seeming difficulty, however, is not a real one but is due to the small scale of typing. If the typewritten letters are magnified 50 times so that they occupy 3 inches square each, and are then superposed, all of which can be accomplished by the artificial eye, it is found that the distinguishing points of each letter form are not covered; in fact, they stand out beautifully individualistic, as is indicated in one of the accompanying sketches.

Unit Design in Marine Wireless Telegraphy

By J. Andrew White

THE transition of an art into a science invariably reflects a number of epochal steps which are widely heralded in the lay press; on the other hand, small notice is taken of developments which scientific workers recognize as those having the most important bearing on ultimate achievement. By way of illustration, radio communication, or the field of the wireless telegraph, has been marked by many brilliant feats of individual skill in annihilating space and setting up odd and startling uses for the ether wave energy; but little has been heard of concerted action among engineers toward the mechanical perfection which is found in the more matured arts. From the onlooker's viewpoint, standardization of wireless equipment has been a matter for the future to take care of, a step to be taken only with the perfection of individual apparatus. Communication over distances once incredible has so occupied the attention of the world that it is scarcely known that the past few months has seen the solution of many problems in marine working, wherein the humanitarian values of the wireless telegraph have been so aptly illustrated in the past. The progress made in mechanical features is strikingly revealed in the announcement by an American wireless company that all its future equipments will conform to a standard design of the unit type, the complete transmitting apparatus being mounted on a single panel and the receiving equipment contained in a case of uniform design.

Aside from the interest aroused in the mechanical development revealed in this new equipment, the standardization feature opens up new possibilities in the acceleration of progress in the wireless art. Commercial operators will no longer have to master a number of types of installation, varying in arrangement, one might venture to say, with a frequency exactly proportionate to the number of ship transfers provided within the period of each individual's service at sea. Many of the staunchest vessels of to-day having been built at a time when wireless telegraphy and its legal status in maritime affairs did not have to be considered, no provision was made by ship designers for installation of apparatus or accommodations for operators. With widely varying conditions of space and location to contend with, the sets were installed principally according to the best judgment of the man assigned to the task. This objectionable condition is now obviously overcome with equipment of standard design available; and uniformity of installation and method of operation may also be expected to furnish cumulative operating experience that will prove of great value in the solution of engineering problems and safeguarding of life at sea.

From the purely commercial side the new equipment possesses many advantages over its predecessors. The

(Concluded on page 336)

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New York's Gasoline-Electric Trucks for Garbage-Collection and Snow-Removal Service

(Concluded from page 327)

dump lifting off the upper deck. The lower buckets are arranged in two longitudinal rows of four each, set into the trailer frame. On top of these are two other buckets with V-shaped bottoms and side doors. The latter are opened to permit the men to dump the cans of garbage or ashes into the eight buckets on the lower deck, the paper and other refuse collected being thrown directly into the two upper buckets from the sidewalk.

In unloading at the disposal pier, the upper buckets are lifted off first, dumped into scows and then set down on the pier floor. Then each of the lower buckets is hoisted out and dumped in a similar manner. They are then loaded back onto the trailer in the reverse manner, when the unit is ready to return to its next point of collection.

The sweeping and flushing of the streets and the plowing of snow in the winter is to be done by special trailers, but the city authorities have not yet appropriated the money for the purchase of these. The tractors were used to plow snow during the recent storms, however, by uncoupling the trailers and applying the conventional front-end plows as shown in one of the accompanying views.

Unit Design in Marine Wireless Telegraphy

(Concluded from page 323)

panel sets are of the noiseless quenched gap type and the occupants of suites de luxe on ocean liners need no longer fear a series of sleepless nights brought on by the nearby crash of the wireless key. Nor will the relaying of messages figure so prominently in the daily routine; the high pitched musical note which replaces the former rasping crackle can be read by the receiving operator through static which would make unreadable a note of lower frequency. Obviously, this penetrating note is also of great advantage in handling message traffic in congested waters and will make for more efficient communication in difficult harbors such as that of New York.

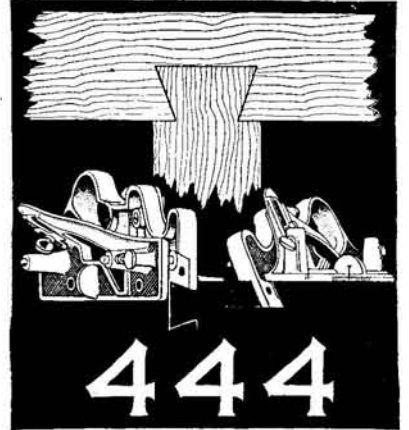
The 2 kw. 500 cycle transmitter, as clearly shown in the illustrations, has all the regulating and manipulating appliances readily accessible; with the turn of a single handle to the desired position a change of wave length from 300 to 450 or 600 meters can instantly be effected. This switch adjusts all circuits and enables the operator to secure flexibility of control in eliminating interference. A wattmeter which indicates the amount of energy consumed at the terminals of the transformer is also mounted on the upper section of the panel. By its side is a radiation meter which indicates the current flow in the aerial circuit, and below a motor field rheostat for variation of the speed of the motor-generator, and a generator field rheostat to vary the generator voltage. Between these rheostats is an indicator handle which effects the variation of inductance in the aerial circuit and indicates the amount in turns. At the lower end of the section a handle is provided for the variation of coupling between the closed and aerial circuits. A switch which permits transmission on extremely low power completes the upper section equipment.

A second or center section of the panel is mounted on hinges and carries the quenched spark gap; this section can easily be swung open from either side whenever it is necessary to remove or replace the condenser jars.

The starting appliances, control switches and protective devices are all mounted on the lower section.

Both quenched and rotary spark gaps are used, the latter being mounted on an extension of the armature shaft at the

Stanley Tools



A Combination Dovetail Tongue and Groove Plane

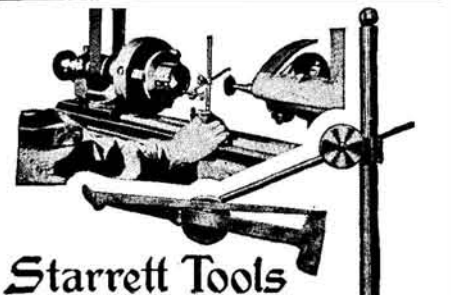
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generator end. The rotary is of the synchronous type with the same number of spark terminals as the generator has poles. Both quenched gap and rotary are served by a pressure blower mounted on the rotor, furnishing air to the quenched gap and ventilating the rotary gap itself. The closed core type of transformer is provided with a protective spark gap at the terminals of the secondary, which permits a discharge to the grounded case of the transformer when the potentials become excessive.

The various elements for the reception of signals are contained in the receiving tuner illustrated. A crystal detector is used. When the receiving circuits are thrown into operative position by the antenna switch the primary circuit of the transformer and the generator field opens and the motor stops. When the switch is thrown to transmitting position the receiving circuits are automatically short-circuited and thus protected from the transmitter. The motor-generator may be kept running continuously by closing a single pole switch.

By the addition of storage batteries the set can be operated independent of the ship's power when this fails, as is often the case in shipwreck.

Over the Whirlpool by Aerial Cable

(Concluded from page 330)

which adjusts any slack caused by the rising and falling of the car. After passing around another groove in the driving sheave, the traction cable passes out to the other end of the car.

The 8-foot driving sheave is turned by a 75-h.p. electric motor, through a 30 to 1 worm gear, giving a speed to the car of about 400 feet per minute when the controller is at full speed. Although the trip can be made in about 4½ minutes, it is planned to permit it to occupy 6 minutes by running at half speed part of the time.

For provision against a possible breakdown of the motor or interruption in the power supply, there is a clutch in the driving shaft by means of which the motor can be disengaged, and a 5-h.p. gasoline engine engaged both through a worm gear and through sprocket wheels. The speed at which the gasoline engine would haul the car would be very slow, but it would be ample to meet the emergency.

Another safety device which is unique concerns the automatic control stop at each terminus, which stops the car with out jar within 3 feet 4 inches. The traction cable runs longitudinally through the 5-inch pneumatic cylinder and through the center of the piston. Just ahead of the car on the traction cable is a clamp which strikes the face of the piston, and engages with it in such a manner that the car cannot slip back from the landing platform. In fact, the car may be said to be locked the moment it comes in contact with the automatic control stop.

The gates at both ends of the car, which are operated by the conductor by means of a crank, cannot open until the clamp has engaged with the stop piston, releasing a ratchet under the car. Even then only the right gates can be opened; that is, the gates at the end of the car where the clamp has engaged. When the car starts the clamp is disengaged by another crank, but this cannot be done until the gates are shut. This is contrived by interlocking discs enclosed in a locked box on the car. The pneumatic cylinder is supported by a counterweight, so that its weight does not rest on the traction cable.

A further illustration of this safety device is afforded by the two limit switches at each terminus. The first is always struck by the floor of the car, and affects the controller so that the power is turned off and cannot be turned on again in the same direction, and so jam the car against the station. The second limit switch is hit only when the first fails to operate, and when the motorman fails to turn off the controller, and when the pneumatic cylinder does not bring the car to a stop. This second limit switch acts directly upon the circuit-breaker, bringing the car to rest within 3 feet, and without letting it come within dangerous distance of the station.

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