No. 622,977. Patented Apr. 11, 1899.

A. L. RIKER.

ELECTRICAL STEERING MECHANISM.

(Application filed May 23, 1898.)

(No Model.) 2 Sheets—Sheet 1.

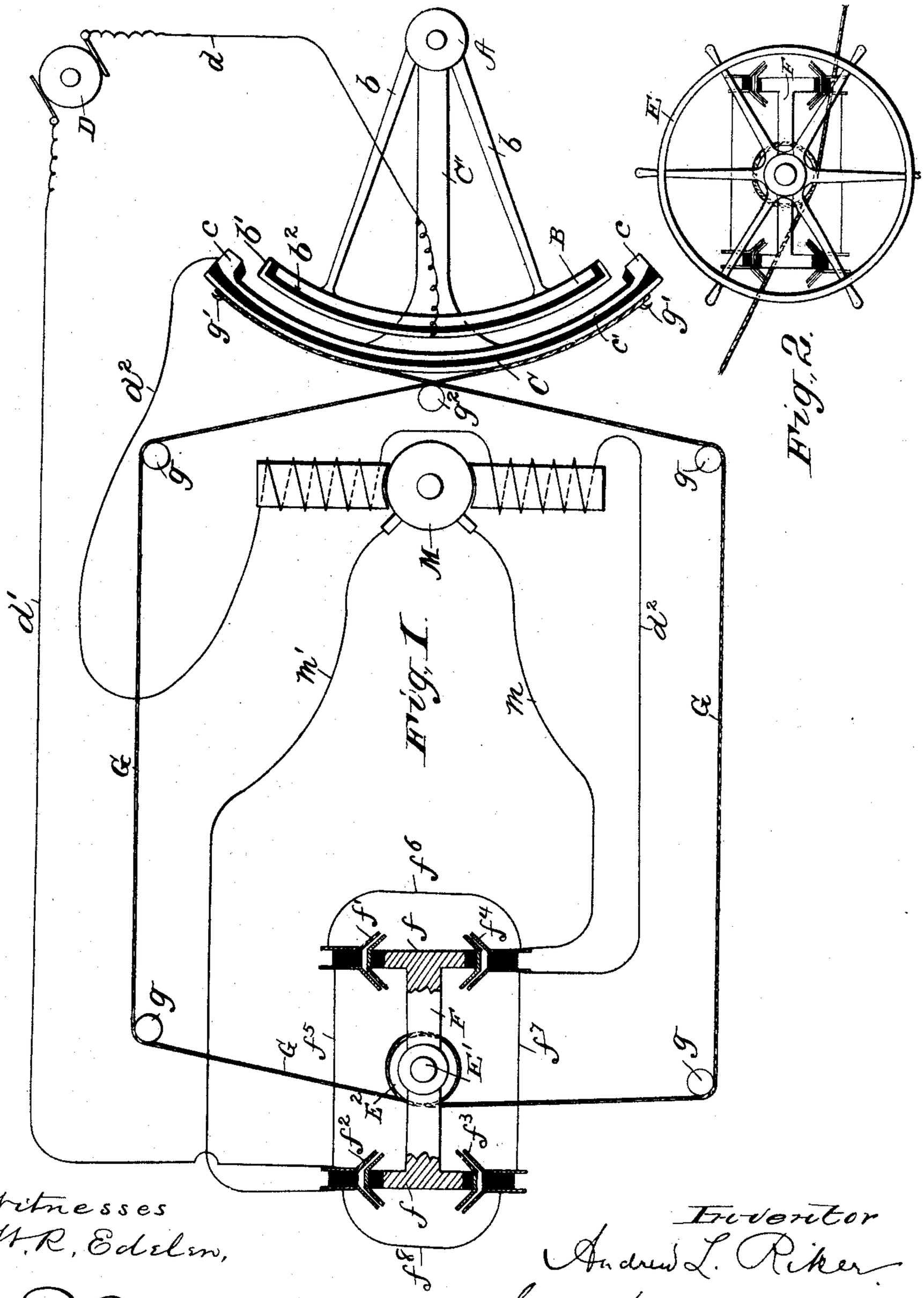

Fig. 2.

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Fig. 3.

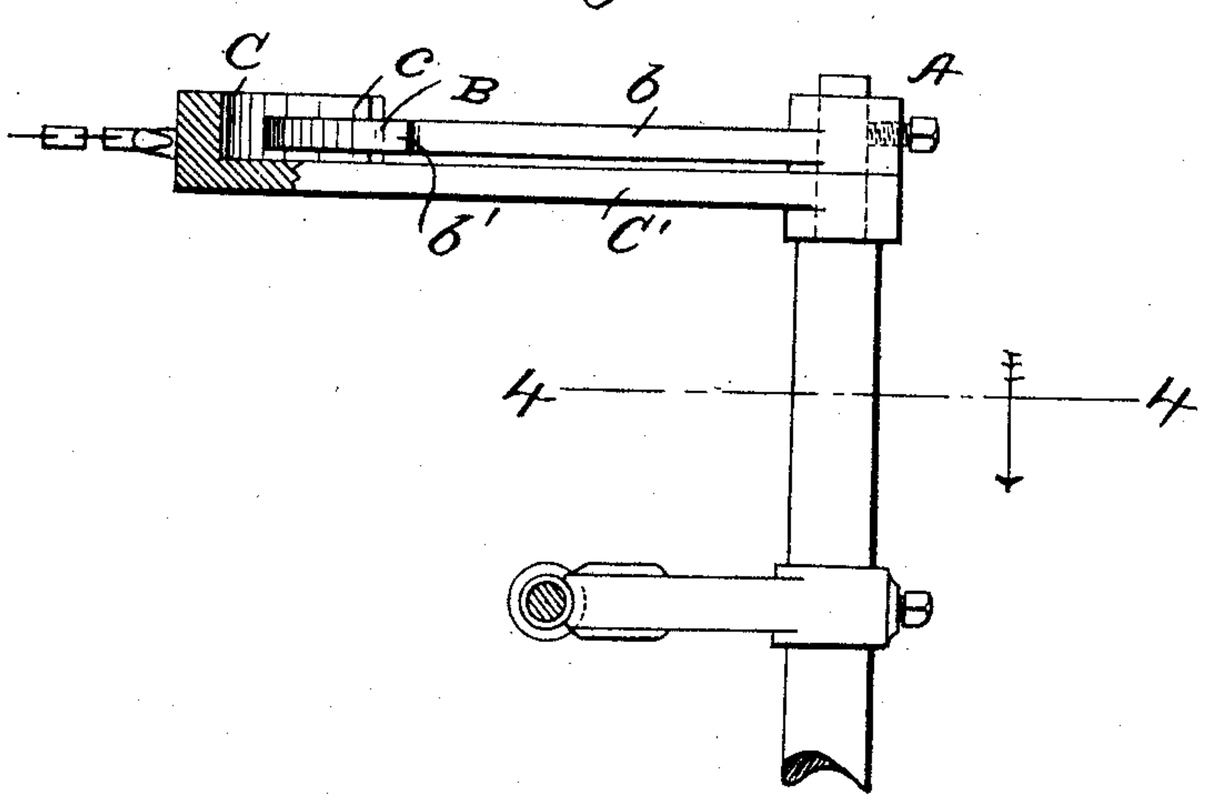
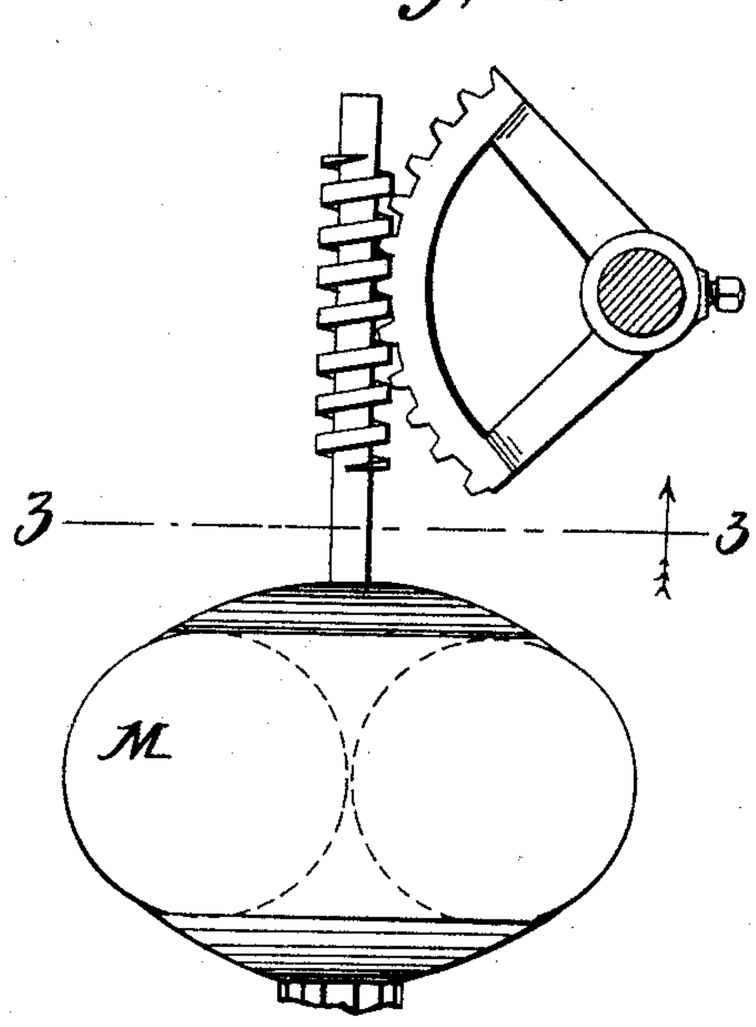


Fig. 4.



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UNITED STATES PATENT OFFICE.

ANDREW L. RIKER, OF NEW YORK, N. Y.

ELECTRICAL STEERING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 622,977, dated April 11, 1899.

Application filed May 23, 1898. Serial No. 681,544. (No model.)

To all whom it may concern:

Be it known that I, ANDREW L. RIKER, of New York, State of New York, have invented a new and useful Improvement in Electrical Steering Mechanism for Vessels, which improvement is fully set forth in the following specification.

My invention relates to electrical steering mechanism for vessels. In mechanism of this class it is necessary that the helmsman should have the rudder-operating motor under complete control to the end that the rudder may be moved through as small or as great an arc as may be desired. It is also essential that the motor be capable of instant operation in either direction, and, furthermore, it is extremely desirable that the control of the motor both as to its direction of movement and the length of time during which it acts should be accomplished through the agency of the ordinary tiller-wheel.

The object of my invention is to supply an electrical steering mechanism that shall meet these requirements; and with this object in view the invention consists of an electric motor for operating the rudder, means operated by the tiller-wheel and controlling the direction of the current passing through the motor, and means also operated by the tiller-wheel which open the circuit leading to the motor when the rudder has reached the desired position.

The invention also consists of certain details, which will be more fully described and then pointed out in the claims.

I have illustrated one form which my invention may assume in the drawings forming a part of this specification, in which—

Figure 1 is a diagrammatic view showing the connection of the various elements of the device. Fig. 2 is a front elevation of the tiller-wheel and the reversing-switch operated thereby. Fig. 3 is a side elevation, partly in section, of the rudder-head and connected parts on line 3 3, Fig. 4; and Fig. 4 is a sectional plan of the rudder-shaft and connections to the motor on line 4 4, Fig. 3.

A is the rudder-head, and B is an arc concentric therewith and rigidly connected thereto by the arms *b*. This arc B carries upon its surface an electrical conductor *b'*, insulated from the rest of the arc by the insulating material b^2.

C is an arc concentric with the arc B and mounted to turn around their common center and with independent motion relative to the arc B. In the drawings it is shown as supported upon an arm C', turning around the stem of the rudder as an axis. The arc C carries at its ends two metal contact points or brushes *c c*, connected by a suitable conducting-strip *c'*, the brushes *c* and the strip *c'* being properly insulated from the arc.

F is a cross-arm through which the shaft E' of the steering-wheel E passes, the arm being closely fitted on the shaft, so that the friction between the two causes the arm to turn with the shaft, but allows the latter to turn independently of the arm if said arm is restrained in its movements. On the opposite ends of the arm F are the T-arms *f f*, which support on their ends each one member of the "jawer-switches" f' f^2 f^3 f^4, properly insulated, as clearly shown in Fig. 1. When the shaft E' is turned, say, from right to left, the arm F turns with it until the switches f' f^3 are closed, after which the shaft may continue to turn in the same direction without further movement of the arm F. A reversal of the direction of the shaft E' would cause the arm F to turn with it, so as to close the switches f^2 f^4.

Attached to the shaft E' of the wheel E is a drum E^2, around which the cable G is wound in opposite directions, so that the revolutions of the drum E^2 wind up the cable on one side and unwind it on the other. The cable G passes over idlers *g*, the ends being crossed over the idler g^2 and connected at *g'* to the arc C.

M is a motor, and D is a dynamo or other suitable source of electrical energy. The dynamo is in electrical connection with the strip *b'* of the arc B, through the wire *d*, while the wire *d'* connects the dynamo with one of the switches, herein shown as f^2. The same switch f^2 is connected to the motor through the wire *m'*, while its diagonally opposite switch f^4 is connected to the motor through the wire *m*. A wire d^2 also passes from the conducting-strip *c'* on one of the brushes *c* of the arc C to the motor to the

switch f^4. The switches f' f^2 f^3 f^4 are connected in series by the wires f^5 f^6 f^7 f^8.

The operation is as follows: Assuming the parts to be in the position shown in Fig. 1, if the wheel is thrown from left to right the switch-arm would turn with the shaft E', closing the switches f^2 f^4, after which the shaft would turn without moving the arm. The revolutions of the drum E^2 through the cable G operate to turn the arc C on its center so that one of the brushes c contacts with the conductor b' on arc B. Circuit is thus closed through wire d, arc b', arc c', wire d^2, switch f^4, wire m, motor M, wire m', switch f^2, wire d', to the dynamo D. The motor through suitable connections, as a worm and gear, as shown in Figs. 3 and 4, turns the rudder in the same direction that the wheel turned the arc C and continues to so turn it until the rudder-head moves the arc B so as to break contact between the brushes c and the conducting arc-strip b', when the motor comes to rest and holds the rudder in its thrown position. A reversal of the motion of the wheel E would close the switches f' f^3, contact the opposite brush c' with the arc b', and send the current through the motor in the opposite direction, thereby reversing the movement of the motor and consequently of the rudder. It will thus be seen that the throw of the tiller-wheel automatically closes the circuit and sets the motor into operation to turn the rudder and that the motion of the latter automatically operates to break the circuit when the rudder has been moved through an arc proportionate to the throw given the wheel—that is, a slight throw of the wheel causes a slight turning of the rudder and a greater throw of the wheel a correspondingly greater turning of the rudder. It is also evident that the direction in which the rudder turns depends upon the direction given to the tiller-wheel.

The device is simple in construction, automatic in its operation, and efficient in the accomplishment of its objects.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electric steering device, a motor in operative connection with the rudder, a source of electrical energy included in a circuit with the motor, a reversing-switch in said circuit, and a second switch in the circuit one member of which is mounted upon and moves with the rudder-head, whereby the movement of the rudder serves to automatically open said switch, substantially as described.

2. In an electrical steering device, a motor in operative connection with the rudder, a source of electrical energy included in a circuit with the motor, an arc supported upon the rudder-head and forming part of the motor-circuit, contact-points normally out of contact with said arc, but capable of motion about the axis of the arc, whereby one or the other of said points may make contact with the arc, and means for shifting said points to the right or left as may be desired, substantially as described.

3. In an electrical steering device, a motor operatively connected to the rudder, a source of electrical energy included in a circuit with the motor, a reversing-switch controlled by the tiller-wheel, and a second switch one member of which is controlled by the movement of the tiller-wheel and the other member of which is mounted upon and moves with the rudder-head, substantially as described.

4. In an electrical steering device, a motor operatively connected to the rudder, a source of electrical energy included in a circuit with the motor, a switch one member of which is positively connected to the tiller-wheel and moved thereby around the rudder-post as an axis, and the other member of which is mounted upon and moves with the rudder-head, and a reversing-switch having a lost-motion connection with the tiller-wheel shaft, substantially as described.

5. In an electrical steering device the combination of a motor and source of electrical energy with a rudder-head, a tiller-wheel, a reversing-switch having frictional connection with the tiller-wheel shaft whereby the tiller-wheel moves the switch but is capable of motion independent thereof, a second switch, one member of which is mounted upon and moves with the rudder-head and the other member of which is mounted to turn on the rudder-head as an axis and having the opposite ends of the tiller-ropes connected thereto, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ANDREW L. RIKER.

Witnesses:
THOS. L. PROCTOR,
A. C. SCHULZ.