

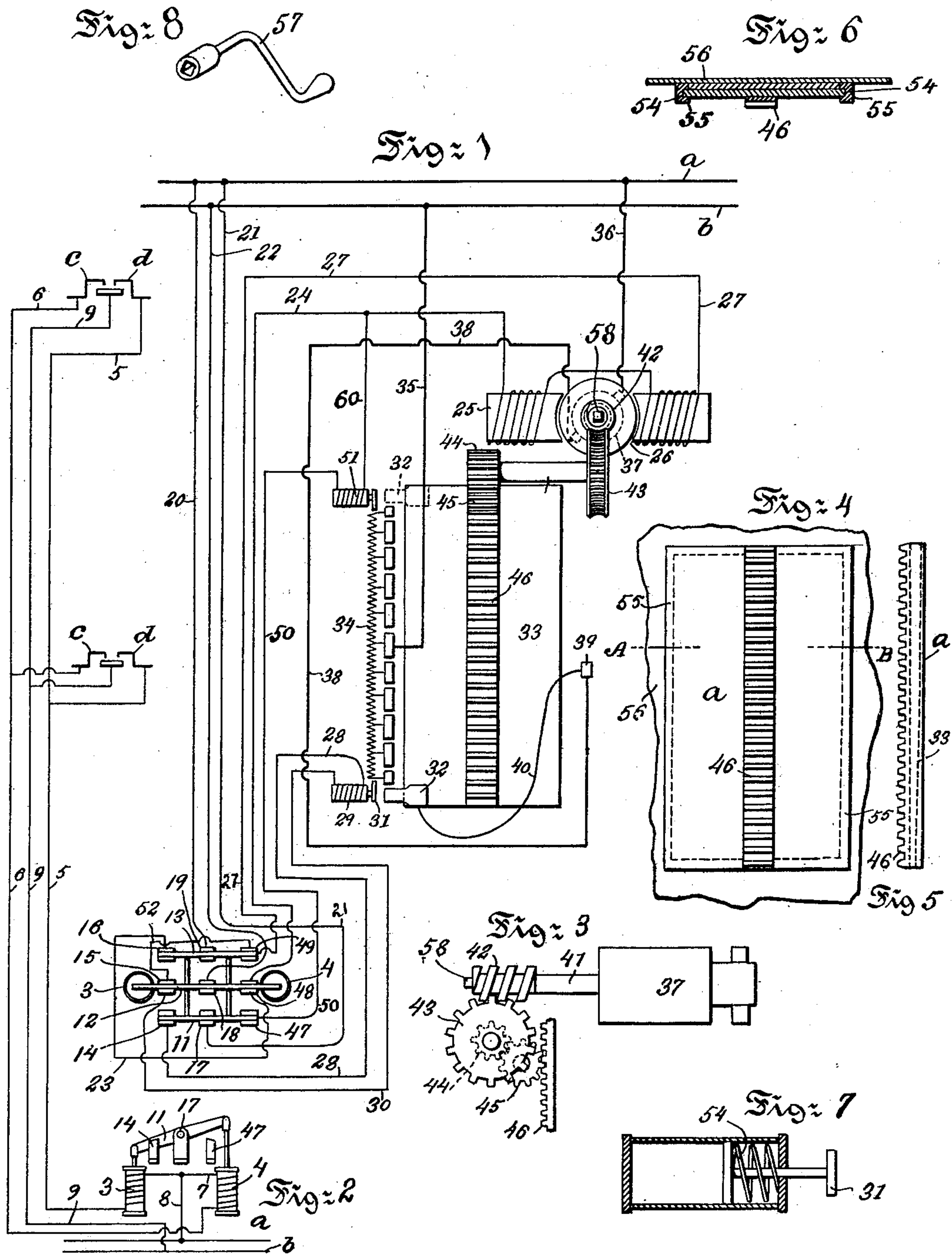
No. 652,302.

Patented June 26, 1900.

A. H. THOMAS & F. B. RICHMOND.
 DEVICE FOR ELECTRICALLY OPERATING BULKHEAD DOORS.

(Application filed May 10, 1899. Renewed Dec. 18, 1899.)

(No Model.)



Witnesses:
W. A. Schaefer.
Craig Shires

Inventors:
 Albert S. Thomas -
 Franklin B. Richmond -
 By their Attorney *Chas A. Rutter*

UNITED STATES PATENT OFFICE.

ALBERT H. THOMAS, OF PHILADELPHIA, PENNSYLVANIA, AND FRANKLIN
B. RICHMOND, OF CAMDEN, NEW JERSEY.

DEVICE FOR ELECTRICALLY OPERATING BULKHEAD-DOORS.

SPECIFICATION forming part of Letters Patent No. 652,302, dated June 26, 1900.

Application filed May 10, 1899. Renewed December 18, 1899. Serial No. 740,823. (No model.)

To all whom it may concern:

Be it known that we, ALBERT H. THOMAS,
a resident of the city and county of Philadel-
phia, in the State of Pennsylvania, and FRANK-
LIN B. RICHMOND, a resident of the city and
county of Camden, in the State of New Jer-
sey, citizens of the United States, have in-
vented certain new and useful Improvements
in Devices for Electrically Operating Bulk-
head-Doors, &c., of which the following is a
specification.

Our invention relates to improvements in
electrically - operated devices particularly
adapted for the operation of doors in water-
tight bulkheads of vessels; and the object of
our invention is to furnish an improvement
in this class of devices which can be operated
in case of need from any desired point or
points upon the vessel.

In the accompanying drawings, forming
part of this specification, and in which similar
letters and figures of reference indicate simi-
lar parts throughout the several views, Figure
1 is a diagrammatic plan of a bulkhead-door
furnished with our improved electrically con-
trolled and operated device for opening and
closing it; Fig. 2, a side elevation of the so-
lenoid-switch for directing and reversing the
current which operates the motor; Fig. 3, a
side elevation of the motor-armature, part of
the bulkhead-door, and the gearing interme-
diate between the motor and the door; Fig.
4, a front elevation of the bulkhead-door and
part of the bulkhead; Fig. 5, a side elevation
of the same, showing the guides in which the
door travels; Fig. 6, a section of Fig. 5 on
line A B; Fig. 7, a longitudinal sectional ele-
vation through one of the solenoids for mak-
ing the first contact between the contact-
point on the door and the contact-points on
the rheostat; Fig. 8, a view of a crank which
can be used to rotate the armature-shaft by
hand in order to operate any particular door
independently of the electrical devices.

a b are main supply-wires which receive
current from any suitable source of electrical
supply.

3 4 are solenoid-magnets, the former of
which is connected with a wire 5 and the lat-
ter with a wire 6.

7 is a wire connecting the coils of the wires

5 6 on the solenoids, 8 a wire connecting wire
7 and the main or positive feed-wire *a*, and
9 a common negative wire connected with the
main negative wire *b*.

c d are push-buttons located at any desired
point on the wires 5 6 9.

In the drawings the wires 8 and 9 are shown
connected to the main supply-wires *a b*. It
will be understood, however, that these wires
8 and 9 may receive current from any suit-
able source.

Supposing the door to be closed and that it
is desired to open it, the button *d* is pressed,
completing the circuit in wires 5 and 9 and
energizing solenoid 3, the core of which is
lowered, drawing down knife-blades 11 12 13,
which make contact with the points 14, 15,
and 16. 17 18 19 are points at which the
knife-blades are pivoted, 20 a wire connect-
ing point 19 with positive feed-wire *a*, and 22
a common negative wire connected with main
negative wire *b*. The wires *a b* have been
and will be described as "positive" and
"negative." It will be understood, however,
that they may be reversed—that is, the wire
b may be positive and the wire *a* negative.
The solenoid 3 having been operated as de-
scribed current will pass from wire *a* through
wire 20 to pivot 19, along blade 13 to con-
tact-point 16, thence along wire 23 to wire
24, along this wire to the field-magnets 25
of an electric motor 26, thence through a
wire 27 to point 49, thence through wire 52 to
contact-point 15, thence to blade 12, and
thence through wire 22 to main negative wire
b, thus energizing the field-magnets 25 and
completing the circuit. At the same time
current passes from line 21 to contact-point
17, to blade 11, along this blade to point 14,
thence along a wire 28 to a solenoid 29, thence
along a wire 30 to point 15, thence along blade
12 to wire 22, and thence to main negative wire
b, thus completing the circuit. The solenoid
29 having been charged its core 31 is moved
out, making contact with both contact-point
32, carried by door 33, and with the lowest con-
tact-point of the rheostat 34. 35 is a wire con-
necting rheostat 34 and negative line-wire *b*;
36, a wire connecting armature 37 and positive
line-wire *a*; 38, a wire connecting armature
37 and a point 39, and 40 a flexible wire con-

necting point 39 and contact-point 32. The core of solenoid 29 having made contact with contact-point 32 and the lower contact-point of rheostat, current passes from line-wire *a* to wire 36, to armature 37, to wire 38, to point 39, to wire 40, to point 32, through core 31 of solenoid 29 to rheostat 34, and thence through wire 35 to negative line-wire *b*, thus completing the circuit and causing the armature 37 to commence to revolve slowly. 54, Fig. 7, is a spring which returns the core of the solenoids to their retracted position when the switch has been operated to cut the current off from them. Upon shaft 41 of the armature is a worm 42, which gears with a worm-wheel 43, upon the shaft of which is a pinion 44, gearing into an intermediate pinion 45, which gears with and drives a rack 46, which is carried by door 33. This mechanism is shown in Figs. 1 and 3. The revolution of the armature through the gearing described lifts the door 33, and as the contact-point 32, carried by the door, gets nearer and nearer the middle of the rheostat, the wire 35 being connected to the middle of this instrument, more and more current is supplied to the armature and its revolution becomes faster and faster. After passing the middle of the rheostat the resistance becomes greater and greater and the speed of the armature is proportionately lessened, so that when contact-point 32 leaves the upper contact-point on the rheostat and the door is fully opened the movement of the motor and door have ceased.

When it is desired to close the door, the button *c* is pressed, causing the solenoid 4 to retract its core and the blades 11, 12, and 13 to make contact with points 47, 48, and 49. This reverses the currents in the field-magnet wires 24 and 27 and the direction of motion of the armature 37. At the same time current passes from blade 11 to wire 50, to solenoid 51, which is a counterpart of solenoid 29, to wire 60, to wire 24, to blade 12, to wire 22, and to wire *b*, thus completing the circuit and starting the door downward in the same manner as has already been described for its upward movement.

The door 33 is wedge-shaped—that is, thicker at the top than at the bottom—and runs in wedge-shaped grooves 54 in guides 55, Figs. 4, 5, and 6, carried by the bulkhead 56. This construction insures a tight fit of the door when closed.

57, Fig. 8, is a crank which may be placed

on the squared end 58 of the armature-shaft in order to revolve this shaft and operate the door 33 by hand.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a controlling device for an electric motor, in combination, said motor, a rheostat furnished with a line of contact-points and connected at or near its center with one of the main line-wires, a movable contact-point, actuated by said motor, adapted to make contact successively with the contact-points of said rheostat, an electric connection between said movable contact, the armature of said motor, and the second main line-wire, and means for energizing the field-magnets of said motor.

2. In a controlling device for an electric motor, in combination, said motor, a rheostat furnished with a line of contact-points and connected at or near its center with the first of the main line-wires, a movable contact-point actuated by said motor adapted to make contact successively with the contact-points of said rheostat, an electrical connection between said movable contact, the armature of the motor, and the second main line-wire, means for energizing the field-magnets of the motor, a solenoid-magnet adapted to make contact between the movable contact-point and the first contact-point of said rheostat, and means for energizing said solenoid-magnet.

3. The combination with an electric motor, a regulator as described for automatically controlling the current supplied to the motor, and a switch for reversing the current to said motor, of a worm of the motor-shaft, a worm-wheel gearing into and driven by said worm, a sliding door, a rack upon said door, gearing intermediate of said worm-wheel and said rack by means of which said door may be operated, a contact carried by said door adapted to make connection with the contact-points of said regulator, a solenoid-magnet for making contact between the movable contact-point and the first contact-point on the regulator, and means for simultaneously energizing the field-magnets of the motor and said contact-making solenoid.

ALBERT H. THOMAS.

FRANKLIN B. RICHMOND.

Witnesses:

WM. H. LEWIS,

CHARLES GRUBER.