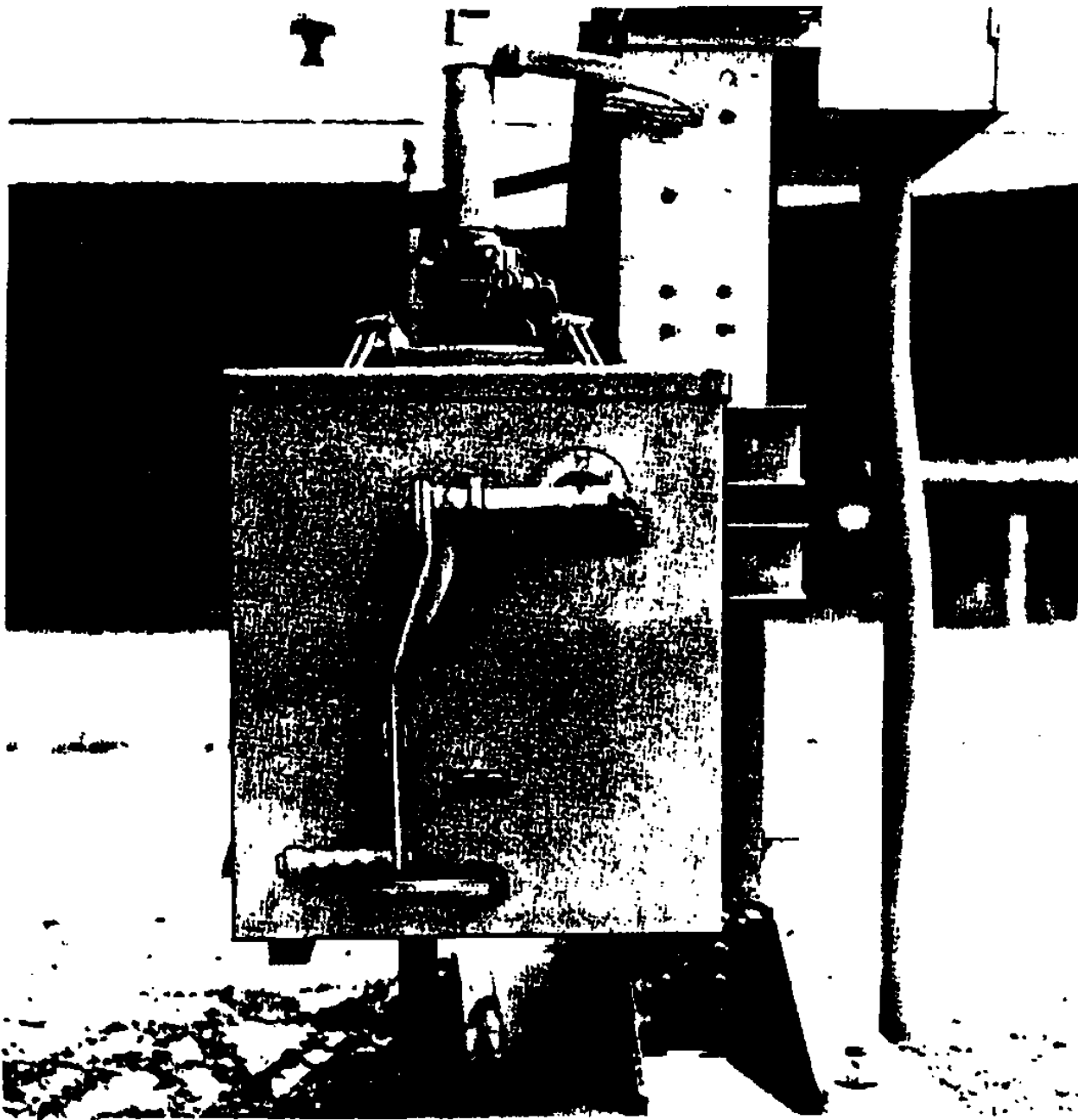


BBC
BROWN BOVERI

Installation/Maintenance Instructions

I-T-E Air Switches — Outdoor

Type MO-10 Motor Operator



IMPORTANT

Make absolutely sure applicable equipment is deenergized and properly grounded before proceeding with any installation or maintenance.

Brown Boveri Electric

IB 2.5.1.7-1

Page 2

INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE OF MO-10 MOTOR OPERATORS

GENERAL

The MO-10 motor operator is a partial revolution mechanism that will operate through a maximum of 270 degrees and may be used with either a direct-torsional or offset-torsional switch operating mechanism.

The MO-10 can be uncoupled from the vertical operating pipe and test operated without disturbing the position of the air-break disconnecting switches. The uncoupled air-break disconnecting switches can be padlocked in either the open or closed position.

For manual operation, insert the operating handle through the opening in the front cover of the housing. As the operating handle is inserted, the motor is electrically disconnected from its control voltage.

INSTALLATION

1. Make sure all air-break switches are in the CLOSED position.
2. Remove the pipe coupling from the motor operator and slide it on the bottom of the vertical operating pipe.
3. Mount the motor operator to the structure. NOTE—Make sure bottom of vertical operating pipe is from 1/4" minimum to 5/8" maximum above top of fixed coupling, Fig. 3.
4. Drill the conduit plate and install wiring. Refer to wiring and schematic diagram on inside of front cover of mechanism.
5. Set the motor operator in the CLOSED position ...
 - a. The number of degrees that the vertical operating pipe must rotate to operate the switches is called "travel." To determine "travel" refer to the switch operating mechanism drawing.
 - b. Mid point of this "travel" should correspond to an imaginary line from the center of the motor operator out to the front. See dotted line on drawing, Fig. 1.
 - c. Half "travel" in either direction will determine the open and closed positions for the fixed coupling. See the other two dotted lines on the drawing, Fig. 1.
 - d. If CLOCKWISE operation (to OPEN) is desired, then half "travel" to the RIGHT (from the front of the motor operator) will determine the CLOSED position. If COUNTER-CLOCKWISE operation (to OPEN) is desired, then half "travel" to the LEFT will determine the CLOSED position.
 - e. Set the open and close indicators in the required positions.
 - f. Insert the operating handle and manually crank the motor operator (Fig. 2) until the notch in the fixed coupling is over the imaginary line for the CLOSED position.

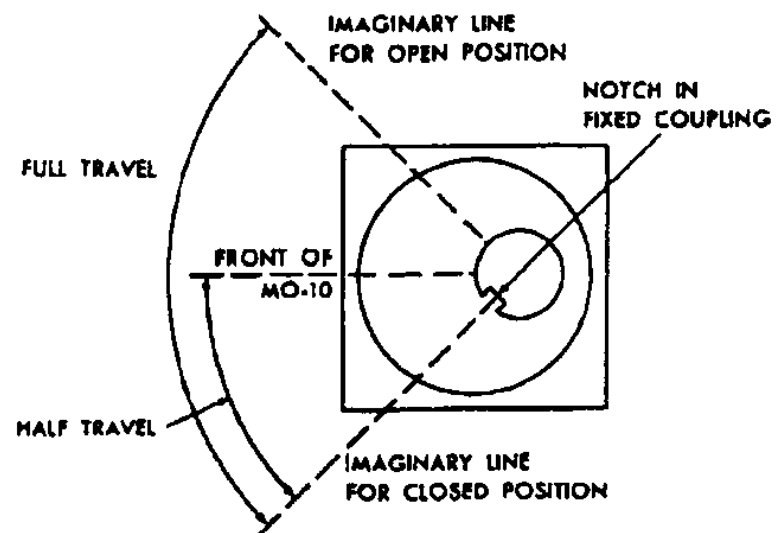


Fig. 1. Adjusting OPEN and CLOSED positions.

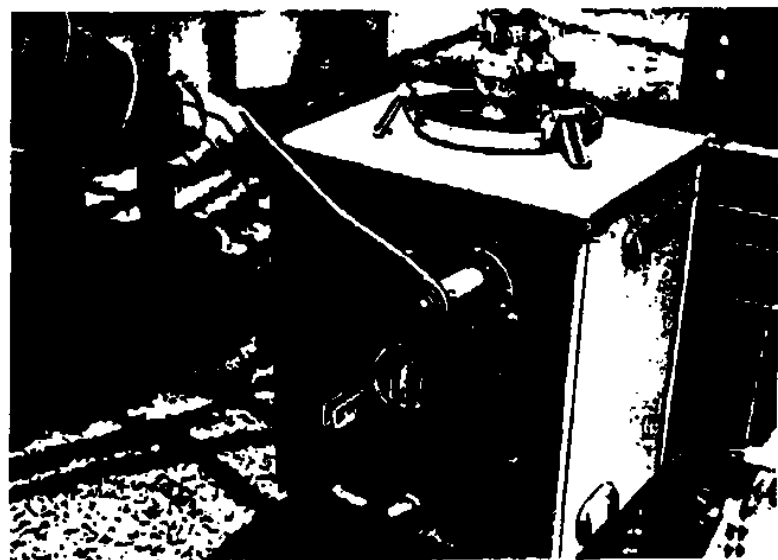


Fig. 2. Manual operation.

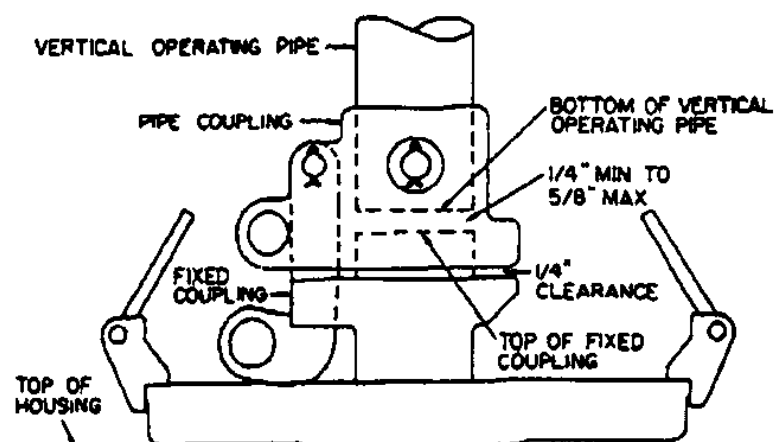


Fig. 3. Pipe coupling latched to fixed coupling.

6. Mate the pipe coupling to the fixed coupling. Put the uncoupling bar of the pipe coupling in the notch of the fixed coupling. Place a 1/4" spacer between the pipe coupling and the fixed coupling to allow sufficient clearance before drilling holes in the vertical operating pipe. See Fig. 3.

7. Drill 5/8" holes in vertical operating pipe to align with holes in pipe coupling.

8. Drive pin thru vertical operating pipe and secure with cotter pin, then remove spacer.

9. Set the CLOSING limit switch (top red cam) on the inside of the motor operator . . .

a. Loosen the hand and jam nuts at the bottom of the auxiliary switches.

b. Set the top red cam as shown in Fig. 4.

c. Tighten the hand and jam nuts.

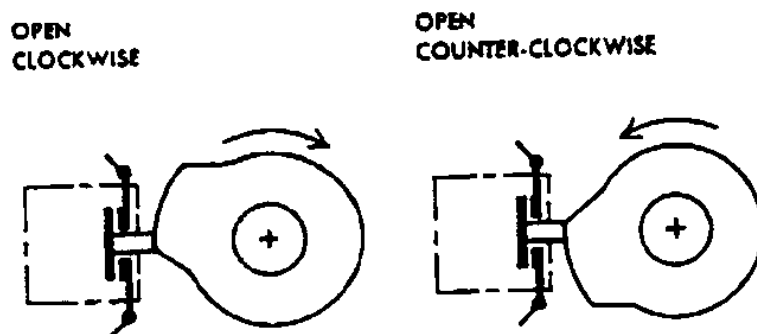


Fig. 4. Setting the CLOSING limit switch.

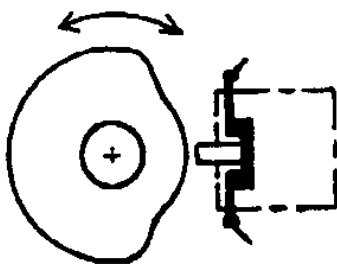


Fig. 5. Auxiliary switch settings. Set cam as shown with mechanism in closed position for type "a"; in open position for type "b".

SPECIAL STEP FOR D-C MOTOR OPERATORS: At this point set the CLOSING auxiliary switch for dynamic braking. Set the top black cam as shown in Fig. 5 - type "a" auxiliary switch.

10. Uncouple the vertical operating pipe from the motor operator by lifting the uncoupling bar on the pipe coupling. Use the chained pin to hold the uncoupling bar in the CLOSED position. See Fig. 10.

11. Electrically test the CLOSING limit . . .

a. Insert the manual operating handle and crank the motor operator toward the OPEN position at least 6 full turns.

b. Remove the manual operating handle.

c. Actuate the CLOSING contactor. (Lift the solenoid plunger, or when supplied, use the CLOSE pushbutton.)

12. If the CLOSING limit is properly set, the fixed coupling should be in position to recouple with the pipe coupling.

13. Recouple the pipe coupling to the fixed coupling.

14. Now set the motor operator and switches in the OPEN position . . .

a. Insert the operating handle and crank the motor operator and switches to the OPEN position.

b. Set the OPENING limit switch (2nd red cam from the top) as shown in Fig. 6. Make sure to tighten the hand nut at the bottom of the auxiliary switches after setting the opening limit switch.

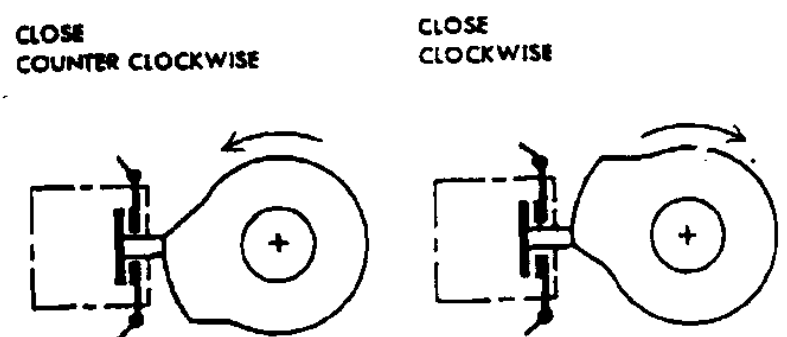


Fig. 6. Setting the OPENING limit switch.

SPECIAL STEP FOR D-C MOTOR OPERATORS: At this point set the OPENING auxiliary switch for dynamic braking. Set the 2nd black cam from the top as shown in Fig. 5 - type "b" auxiliary switch.

15. Uncouple the vertical operating pipe from the motor operator by lifting the uncoupling bar of the pipe coupling. Use the chained pin to hold the uncoupling bar in the OPEN position.

16. Electrically test the OPENING limit . . .

a. Crank the motor operator toward the CLOSED position at least 6 full turns.

b. Remove the manual operating handle.

c. Actuate the OPENING contactor. (Lift the solenoid plunger, or when supplied, use the OPEN pushbutton.)

17. If the OPENING limit is properly set, the fixed coupling should be in position to recouple with the pipe coupling.

18. Recouple the pipe coupling to the fixed coupling.

19. When everything is adjusted, set the motor operator and switches in the CLOSED position.

20. After the remaining auxiliary switches (black cams) are set, the motor operator is ready for electrical operation.

21. Operate the mechanism several times (electrically) and reset the limits if necessary.

MAINTENANCE

Periodically inspect the motor reverser for signs of contact wear.

No lubrication of motor or gears is required.

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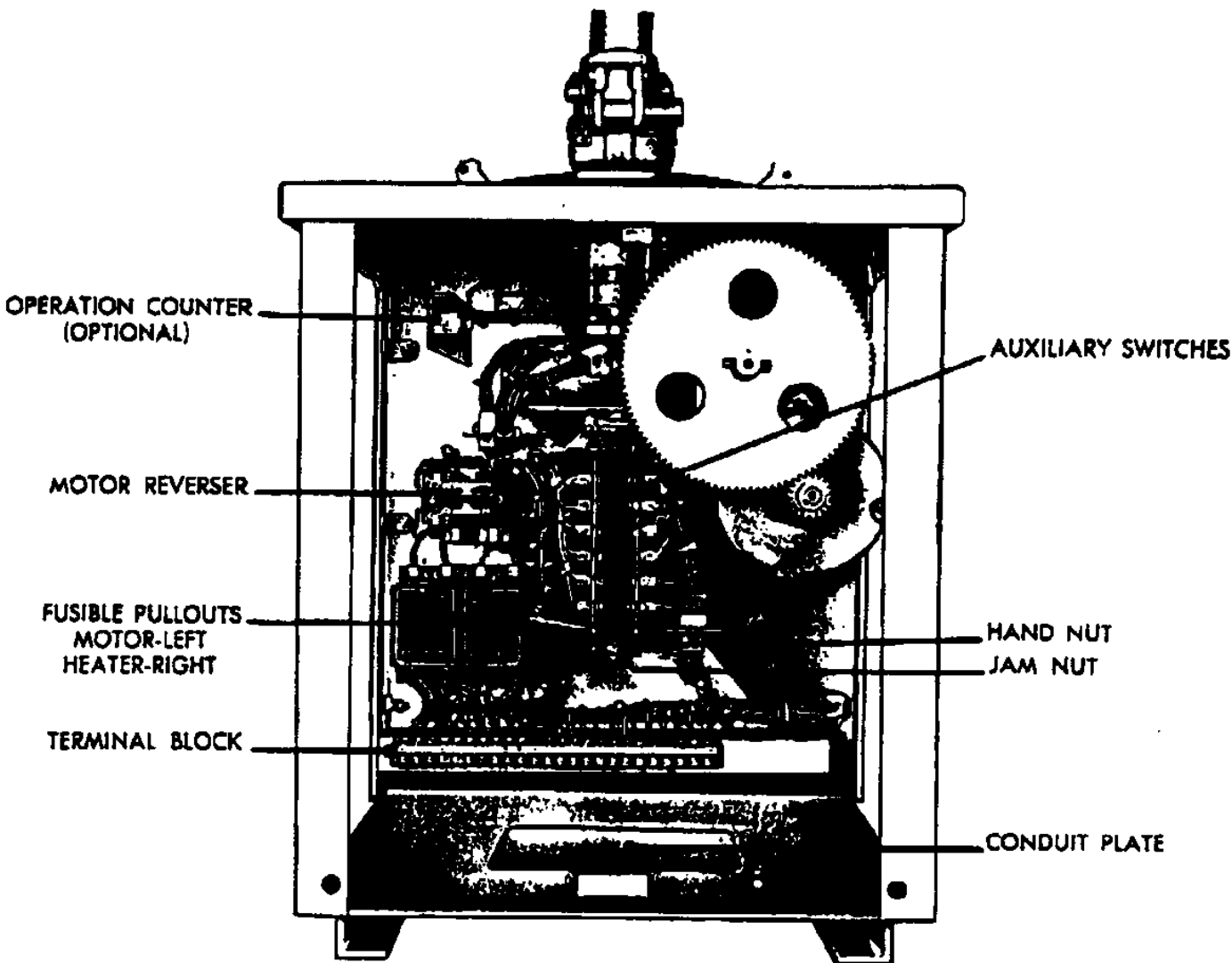


Fig. 7. MO-10 motor operator, inside view;
gear cover removed to show detail.

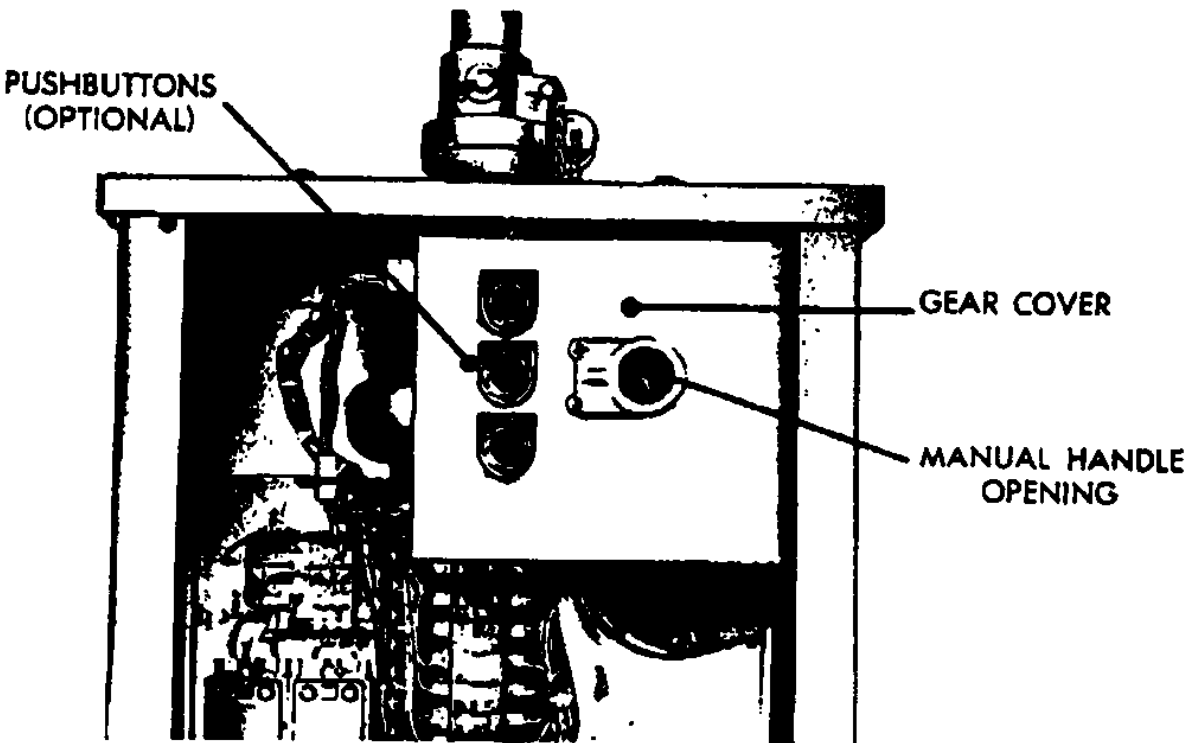


Fig. 8. Inside view with gear cover in position.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes the matter should be referred to the nearest District Office.

IB 2.5.1.7-1

Page 5

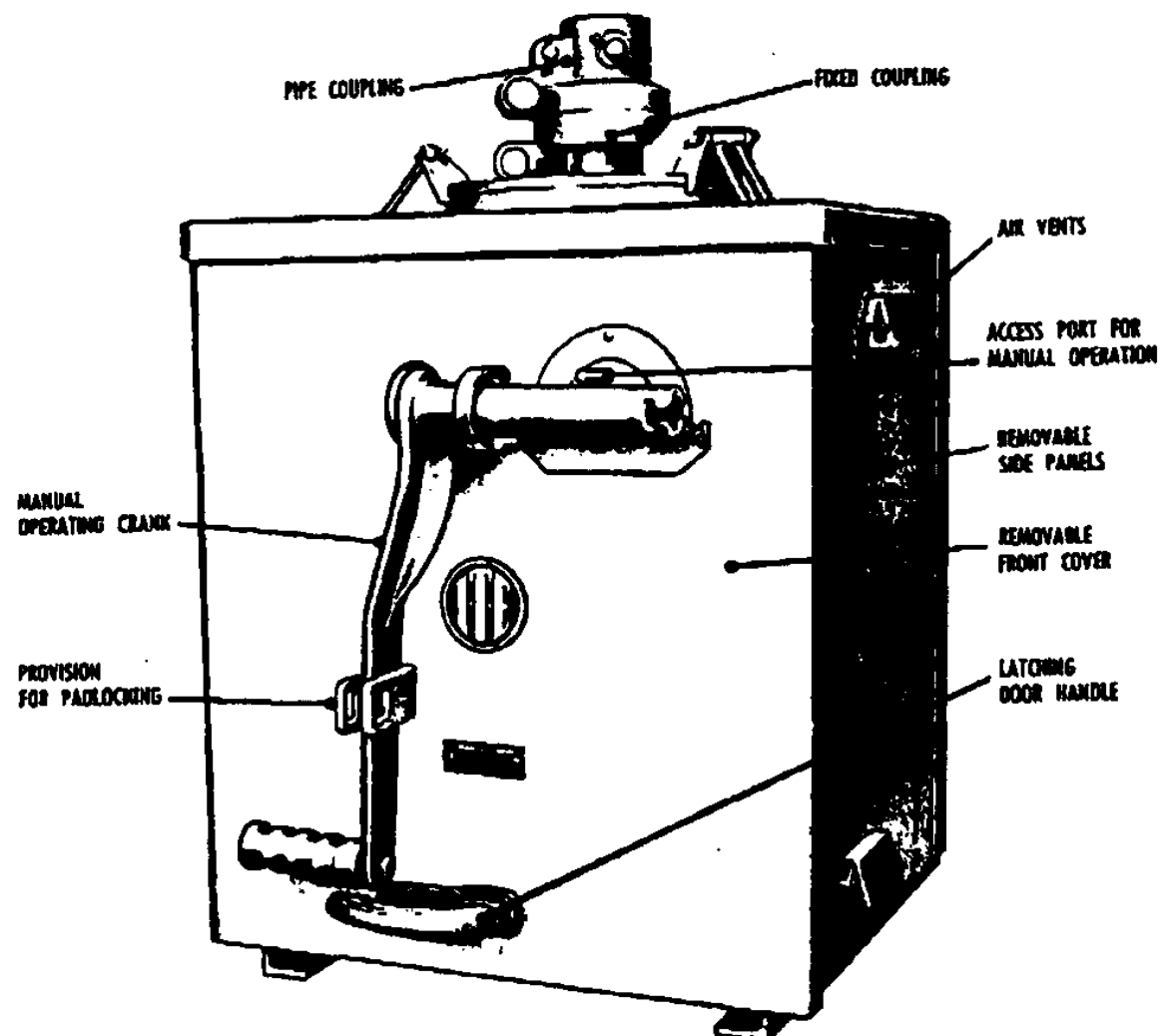


Fig. 9. MO-10 motor operator, outside view.

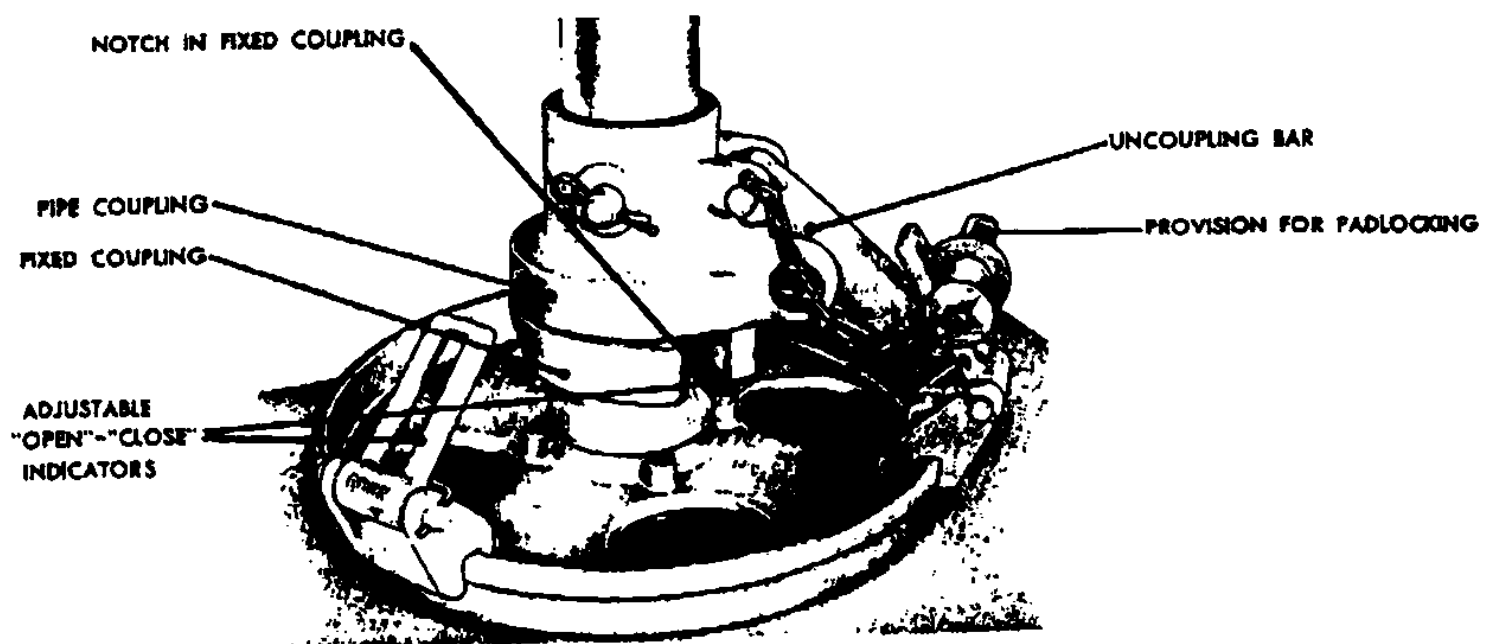


Fig. 10. Motor mechanism disengaged;
operating pipe latched in closed position.