clutch control relays, and control transformer This panel should be on or immediately adjacent to the machine it serves, but out of the operator's way during normal operation It should be properly identified and accessible for maintenance (Fig 25-38)

The main disconnect switch handle should be on the exterior of the control enclosure and operable from floor level The recommended maximum height of the centerline for the switch handle is 6½ ft above the floor The switch should be provided with a means for positive lockout

Selector switches used for setting the mode of operation—such as single-stroke, run, inch, two-hand, or foot—should be of the key-lock type to prevent unauthorized change of operation

Operating controls should be located or guarded to minimize the possibility of unintentional operation Foot switches should be guarded to prevent activation by falling objects or by accidentally stepping on them A foot switch should only be used where satisfactory operator protection is provided Hand buttons should be physically located or guarded so that operation by a single hand and arm or elbow is impossible Stop buttons should be conveniently and conspicuously located and left unguarded Emergency stop buttons should be mushroom shaped and colored red

All operating buttons should have metal cases and covers Where mushroom heads of run buttons are used, they should be of metal or plastic (metal preferred) and grounded to protect the operator from shock in case of electrical defect

Cases or frames of all control devices should be grounded to the press frame Mounting bolts are satisfactory for grounding provided all paint and dirt are removed from joint surfaces before assembly Movable control devices not secured to the press frame should be grounded by means of a grounding conductor in the connecting cable or conduit

The rotary limit switch is a vital element in the control system Mechanical or electrical failure of this switch may cause the press to repeat. The switch driving mechanism—including all couplings, gears, sprockets, and associated parts—should be securely assembled and of rugged design A positive, keyed connection is preferred to set screws, as these *have a tendency to vibrate loose*

The use of two separately driven switches or a drive failure detector is recommended All cam switches should be of a type in which the switch contacts are forced open by the actuating cam

1 Where a flywheel brake is used, it should be electrically interlocked with the main drive starter to prevent simultaneous operation

2 When safety blocks are used, they should be provided with interlock plugs which disconnect the clutch and motor control circuits when blocks are in place between the dies (See Fig 25-39)

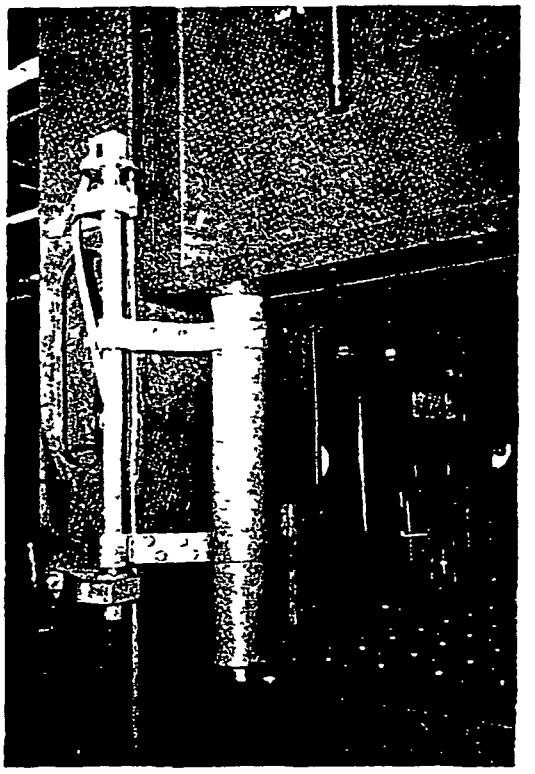


FIG 25-39 —When making adjustments on press, the upper die should be propped to eliminate any unexpected motion

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