Solid State Circuit Controls Direction, Speed, and Braking of DC Motor

The problem:
Various solid state devices are used to control the speed of dc motors, but do not provide for reversing or braking which are required for accurate positional control of large inertial loads.

The solution:
A full-wave bridge rectifier circuit in which the gating of silicon controlled rectifiers (SCR’s) controls output polarity. Braking is provided by an SCR that is gated to short circuit the reverse voltage generated by reversal of motor rotation.

How it’s done:
Diodes D₁ through D₄ form a conventional full-wave bridge providing full-wave pulsating dc voltage between points a (positive) and b (negative). Point a is connected to a bridge consisting of SCR₁ through SCR₄. By gating SCR₁ and SCR₃, an external load will see point d positive with respect to point c. If SCR₂ and SCR₄ are gated, the opposite condition will exist. Braking is accomplished by gating SCR₅ after removal of the gate signals from SCR₁ through SCR₄. SCR₅ then short circuits the voltage generated by the armature rotation. The capacitor keeps voltage transients from misfiring the SCR’s.

(continued overleaf)
Note:
Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, California 91103
Reference: B66-10486

Patent status:
Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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