Simple, One Transistor Circuit Boosts Pulse Amplitude

The problem:
A requirement existed to supply a pulse voltage, higher than that normally available from emitter-follower circuits, to drive a 100-watt transmitter.

The solution:
A simple circuit that uses a single transistor to accomplish capacitor storage followed by common-base switching.

How it's done:
Capacitor C1 is charged through R1 and R2 to the supply line voltage, V1. With no input pulse, both the emitter and base of the transistor are at the same potential, and the collector is cut off. With an input pulse V2 present, the potential of C1 with respect to ground is increased by V2. The emitter becomes more positive than the base and the transistor is switched on. This results in an output pulse, V3 that is equal to V1+V2, minus negligible losses in C1 and the transistor.

Notes:
1. In order for C1 to reach approximate full charge between pulses, the ratio of charging interval to charging time constant must be much greater than the ratio of discharge interval to discharge time constant.
2. In tests, this circuit has produced a good output waveform at about twice the amplitude of the supply line voltage, V1.
3. Inquiries concerning this innovation may be made to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland 20771
Reference: B66-10480

(continued overleaf)
Patent status:
No patent action is contemplated by NASA.
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