June 1964 Brief 63-10024

NASA TECH BRIEF

Solenoid Permits Remote Control of Stop Watch and Assures Restarting

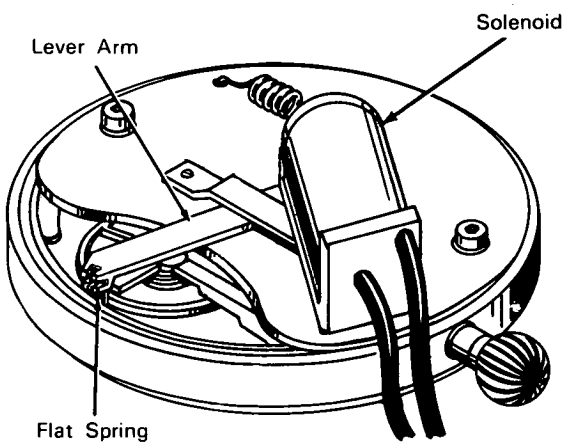

FIGURE 1

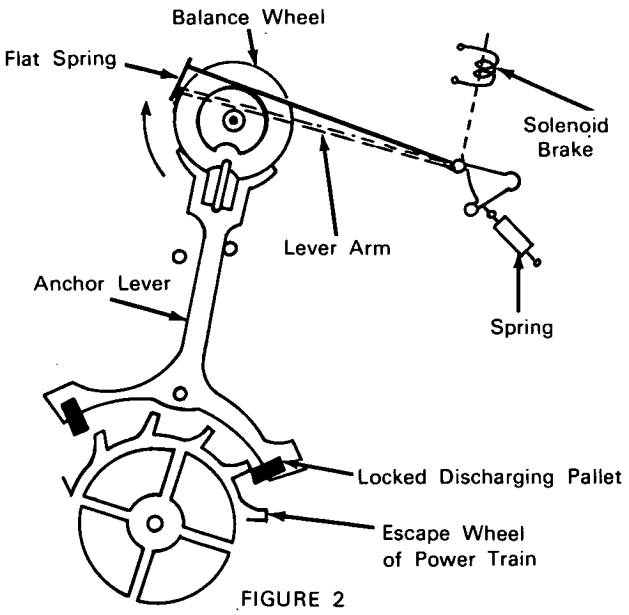

FIGURE 2

The problem: Remote control of a stop watch by a switch or a pushbutton. Positive restarting must be assured.

The solution: A solenoid-controlled stop lever mechanism mounted on the stop watch. The mechanism holds the balance wheel in a stopped position unless the solenoid is energized. When it is energized, the solenoid causes the stop lever to impart a starting spin to the balance wheel.

How it's done: This device incorporates a small solenoid that operates a pivoting lever arm. A small coil spring pulls one end of the lever arm away from the solenoid. At the other end of the arm a flat spring is mounted so that it projects into the watch and engages the perimeter of the balance wheel when the lever arm is pulled by the coil spring. When the solenoid is not energized, the coil spring will pull the lever arm and stop the watch. When the solenoid is energized it snaps the flat spring end of the lever arm away from the balance wheel. The lever arm is so mounted that the flat spring engages and disengages the balance wheel with a tangential motion (see Figure 2). The flat spring thus imparts a starting spin to the balance wheel as it breaks contact with the wheel. The spin is sufficient to store enough energy in the balance wheel spring to impart the necessary impulse to the anchor lever to release the pallet lock and start the normal cycle of the watch. Starting is assured regardless of the balance wheel stopped position.

(continued overleaf)

Notes:

1. The cost of incorporating this feature in a standard stop watch is nominal.
2. Events of short duration—as short as one-fifth of a second—can be accurately recorded and the cumulative time of a series of such events is easily obtained.
3. The device is most useful in applications where synchronization of events and accurate timing of start and stop are desired. This can be achieved by utilizing the electrical energy for event operation to energize and de-energize the solenoid.
4. Specific applications might include: engine-run timing; chemical reaction timing, or timing of any start-stop operation where an electrical signal is available. The remote-control feature would be particularly desirable for operations hazardous to personnel or where environmental conditions of cold, heat, or airblast are a problem.
5. For further information about this innovation inquiries may be directed to:
   Technology Utilization Officer
   Flight Research Center
   P.O. Box 273
   Edwards, California 93523
   Reference: B63-10024

Patent status: NASA encourages the commercial use of this innovation. No patent action is contemplated.

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