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NASA TECH BRIEF

Marshall Space Flight Center

Emergency-Escape Device

The problem:

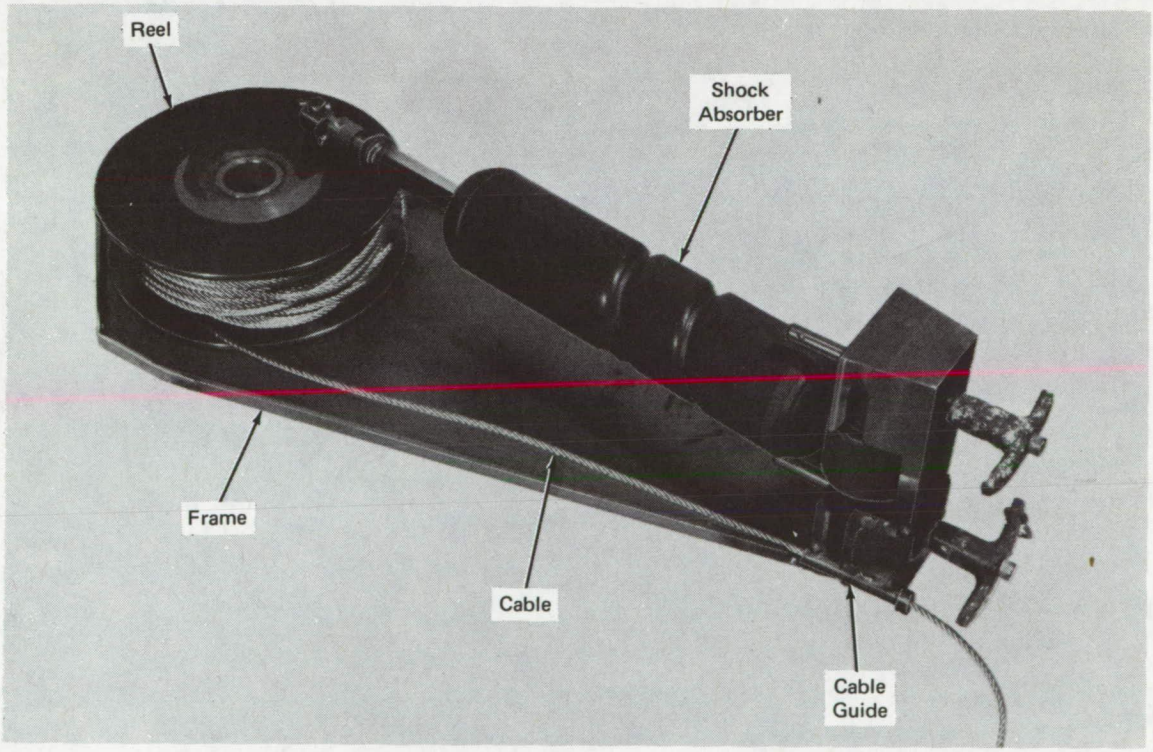
Burning buildings have been deathtraps ever since construction began. Even to this day, with all of our fire safety regulations, fires, particularly in high-rise buildings, continue to trap inhabitants in their rooms, because either the stairs are impassable, the elevators do not operate, or no fire escapes are installed. With all escapes blocked, the inhabitants either expire in their rooms or jump to their death from windows. To eliminate the risk of jumping from windows, several devices have been made to provide safe descent. Unfortunately, these devices are complicated to operate and require some degree of athletic ability.

The solution:

A relatively simple inexpensive device using a reeled steel cable, controlled by an automotive-type shock absorber, allows safe descent from a burning building.

How it's done:

The device is a metal frame containing a cable-wound reel and a shock absorber (see figure). The cable is made of steel wires, capable of supporting a 1000-lb (454-kg) load, and is of sufficient length to reach the ground from any window used for escape. One end of the shock absorber is attached firmly to the frame; the other end is attached to a stud on the reel center.



Emergency Exit Device

(continued overleaf)

In an emergency, a man-carrying harness is attached to the free end of the cable. As an individual descends from a window, the cable unwinds and rotates the reel which, in turn, compresses and extends the shock absorber. The rotation of the reel is opposed by the absorber; the faster the reel rotates, the greater the opposing action of the absorber. Thus, for the given weight of an individual in the harness, an equilibrium is reached, resulting in a constant speed. As designed, the device can lower a 150-lb (68-kg) person at a rate of 2 ft/s (0.6 m/s). Heavier persons will descend at a slightly faster rate, lighter ones slightly slower. After the first person reaches ground, the cable is retracted manually, by detaching one end of the shock absorber from the frame and using it as a rewinding handle.

The device is cheap to manufacture and assemble. It weighs 8 lb (3.6 kg) and requires neither skill, special knowledge, or athletic ability to operate. It is reliable and fireproof and can be deployed instantly. In practice, it may be anchored to a permanent installation outside of a window or to a wall inside.

Notes:

1. A spring-loaded ratchet, to retract the cable automatically after it reaches the ground, can be added to the device.
2. Requests for further information may be directed to:
   Technology Utilization Officer
   Marshall Space Flight Center
   Code A&PS-TU
   Marshall Space Flight Center, Alabama 35812
   Reference: B73-10369

Patent status:

NASA has decided not to apply for a patent.

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