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Date: June 21, 2023

Subject: Flap Switch Examination / Information

Initially the pilot reported no mechanical malfunctions related to the airplane, so the airplane was released to the owner. Later, the pilot reported that he didn't hear the stall horn and suspected it was inoperable. He also stated the flap switch stuck in the up position which retracted the flaps fully and contributed to the airplane stalling.

Upon receipt of the new information an attempt to examine the airplane was made. During the follow up, the FAA reported that the airplane had already been stripped down and salvaged. The condition of the airplane precluded examination of the stall horn but did allow the flap switch to be removed and retained for further examination.



The flap switch was marked "MS25201-5." This military specification (mil spec) was used to determine the normal operation of the switch. According to publicly available information, the switch has three positions: Up, Center, and Down.

If activated to the **Up position** the switch will stay in the up position indefinitely until it is physically moved back to the Center or Down positions.

If the switch is put in the **Center position** it will stay there until moved.

If the switch is activated to the **Down position**, the switch is spring loaded and will return to the Center position once physical pressure is removed from the switch. The down position is in alignment with a keyway in the barrel of the assembly.

This information corresponds to the Cessna Owner's manual description of the flap system operation (see below).

WING FLAP SYSTEM.

The wing flaps are electrically operated by a flap motor located in the right wing. Flap position is controlled by a switch, labeled WING FLAPS on the lower center portion of the instrument panel. Flap position is shown by an indicator on the lower right portion of the instrument panel below the right control wheel position.

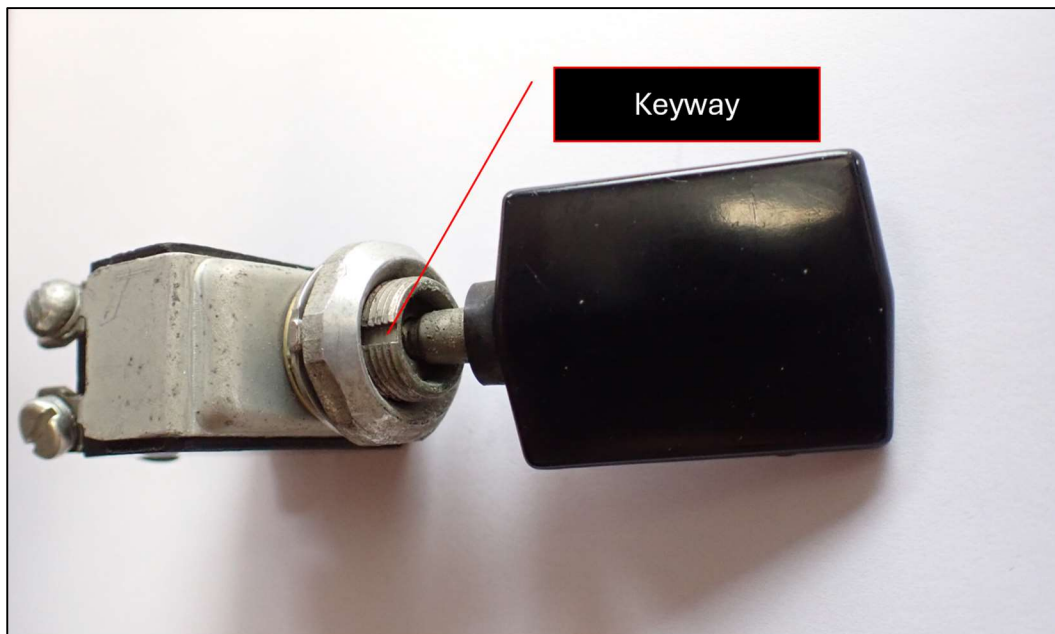
To extend the wing flaps, the flap switch must be depressed and held in the DOWN position until the desired degree of extension is reached. Releasing the switch allows it to return to the center off position. Normal full flap extension in flight will require approximately 9 seconds. After the flaps reach maximum extension or retraction, limit switches will automatically shut off the flap motor.

To retract the flaps, place the flap switch in the UP position. The switch will remain in the UP position without manual assistance due to an over-center design of the switch. Full flap retraction in flight requires approximately 7 seconds. More gradual flap retraction can be accomplished by intermittent operation of the flap switch to the UP position. After full retraction, the switch is normally returned to the center off position.

The accident airplane switch was examined, and function checked in all three switch positions - it worked correctly and no anomalies were noted.



Accident airplane flap switch



Accident airplane flap switch keyway. Denotes down position when switch is activated in the direction of the keyway.