The Dacron lanyard is being changed from a 50-pound test rated material to a 180-pound test rated material with acceptance pull tests being increased to 20 pounds for the entire system.

This anomaly is closed.

14.4.3 Intermittent Lock of Universal Handling Tool In Suprathermal Ion Detector Fitting

While carrying the suprathermal ion detector experiment from the subpallet to the emplacement site, the experiment fell off the universal handling tool at least twice. The experiment sustained no visible damage and has been operating satisfactorily.

The universal handling tool fitting on this experiment is in the highest location above the lunar surface of any of the fittings and presents an awkward position of the tool for insertion, locking, and maintaining lock in the fitting (fig. 14-46).

Corrective action includes training procedures to avoid inadvertent tool-release triggering because of the position of the tool. There are no present plans for the suprathermal ion detector experiment to be carried on future missions, and no other scheduled experiments have a similarly located fitting.

This anomaly is closed

14.5 GOVERNMENT FURNISHED EQUIPMENT

14.5.1 Television Control Unit Clutch Slippage

During the second extravehicular activity, the camera could not be elevated as the unit approached the upper or lower limits of angular travel. The condition further deteriorated during the third extravehicular activity.

Elevation control is provided to the camera cradle through a friction clutch (fig. 14-47) which allows manual override of the ground-commanded camera positioning. The camera-cradle pivot point is approximately 3 inches below the center of gravity of the cradle with the camera mounted. As the camera moves away from the horizontal position, the unbalanced moment becomes progressively greater, and a higher torque load must be supported by the clutch mechanism.

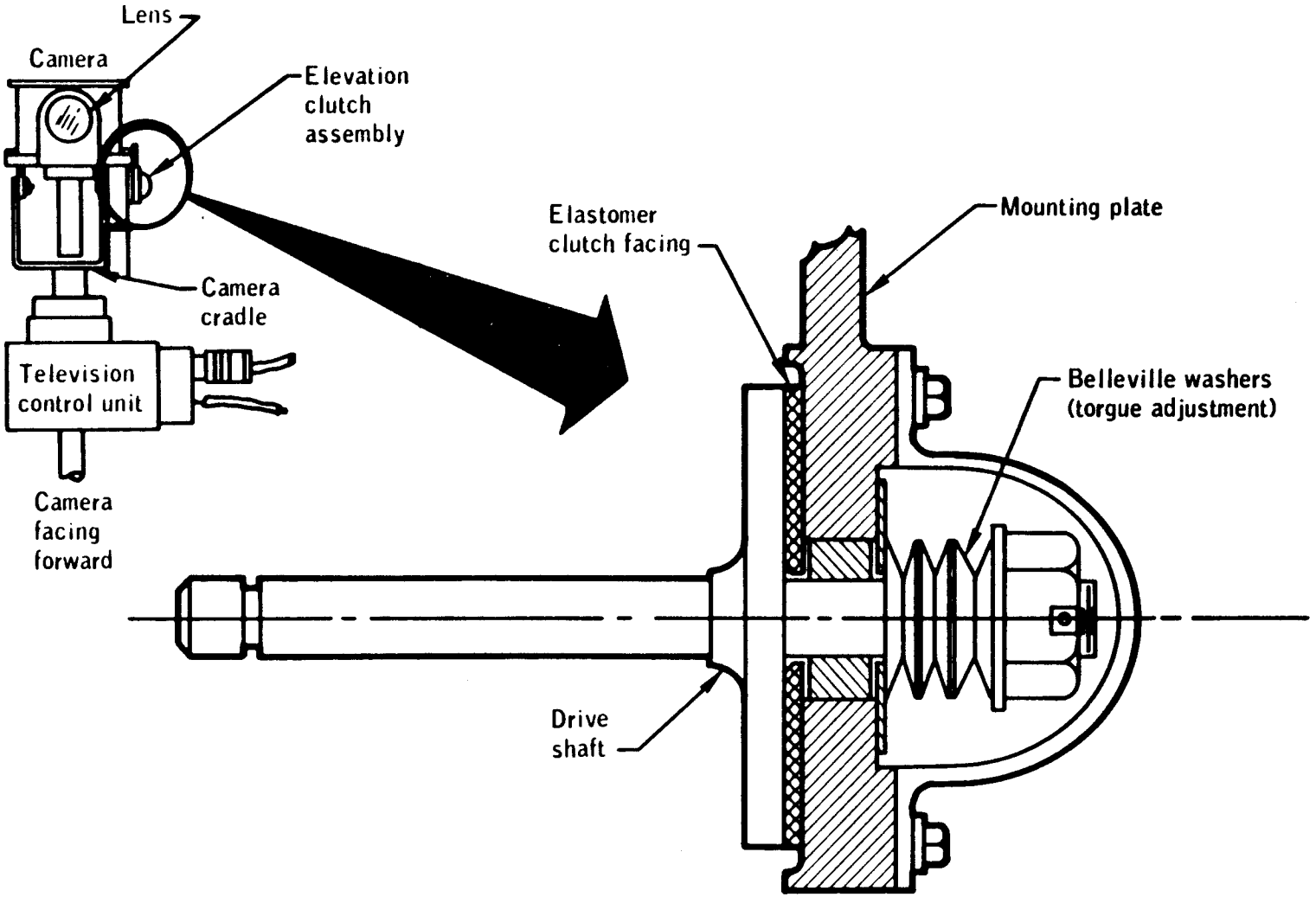

Figure 14-47.- Camera elevation control clutch.

The elastomer clutch-facing material provided the required stable friction properties in the specification and qualification test temperature range (122° F, maximum). However, the maximum temperature on the television control unit during the third extravehicular activity has been calculated as approximately 180° F. Materials specifications show that the compressive strength of the elastomer degrades rapidly at this temperature, and ground tests with flight unit 4 verify severely degraded performance with time at elevated temperature.

The clutch is being changed to a metal-to-metal spring ring design in place of the elastomer disc. The clutch torque for Apollo 15 was set at 16 inch-pounds for ease of manual adjustment. For greater stability on Apollo 16, the new clutch is being built with a torque of 30 inch-pounds, which is still comfortable for manual positioning and is within design limits of the system, including the gear train (35 inch-pounds).

This anomaly is closed.

14.5.2 Lunar Communications Relay Unit Downlink Signal Lost

The lunar communications relay unit downlink signal was lost about 40 hours after lunar module ascent. The unit operated on internal battery power during the extravehicular traverses. Near the end of the third extravehicular activity, it was manually switched to lunar roving vehicle power in preparation for viewing ascent and for continuing television observations. The power distribution from the lunar roving vehicle to the television system is shown in figure 14-48. The lunar communications relay unit transmitter and television camera had been commanded on from the ground 13 minutes prior to the RF downlink-signal loss. The lunar communications relay unit status subcarrier had been commanded on 7 minutes prior to signal loss. The television camera was stationary and a 1-second incremental iris movement was occurring at the time of signal loss.

The flight data (fig. 14-49) shows that the automatic gain control measurement began to fall followed by the video signal decay. This was followed by the decay of the lunar communications relay unit temperature measurement. The RF signal level then decreased below the ground receiver's threshold as indicated by complete signal loss. The overall loss of the downlink signal within 5 milliseconds is indicative of 28-volt d-c power loss. Decay of the temperature measurement is indicative of 16.5-volt d-c power loss. The lunar communications relay unit dc-to-dc converter (fig. 14-48) supplies both the 28-volt and 16.5-volt d-c power. To verify loss of 16.5-volt power, an uplink voice signal was transmitted to key the VHF transmitter on. No signal was received on the Stanford