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LINKED STRUCTURES FOR JAM ACCESS WITH PRECISE DATUMING

HP INC

Linked structures for jam access with precise datuming

ABSTRACT

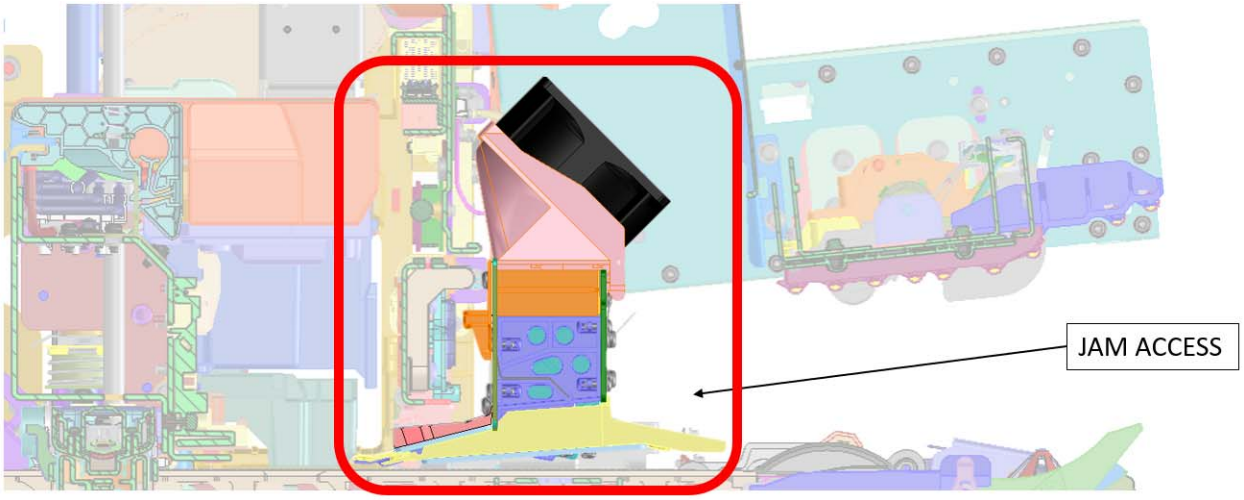
Printers usually have large beams inside that require very precise positions. The room around the printzone is usually very packed, making it hard to access when it is necessary to remove a paper jam or replace an internal part around that area.

In this disclosure a way to link two structures to one lifting system will be explained.

PROBLEMS SOLVED

This disclosure will explain a way to compatibilize jam access with packed printzones, without the need of active motors.

In this specific case, the airflow beam was blocking completely a big printzone area, susceptible to jams. To allow the removal of these jams, user access is needed.

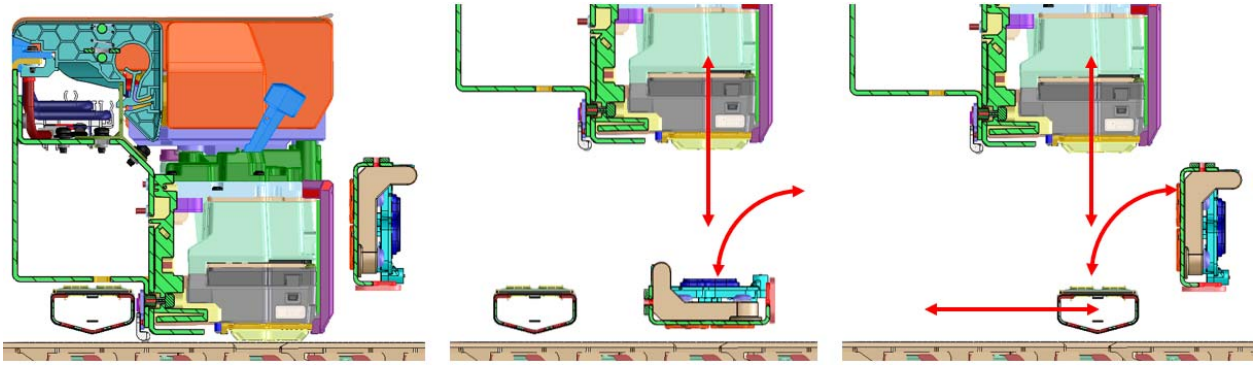


The solution explained in this disclosure allows access to the printzone area with one user interaction (pressing a button) and has optimized the cost of the movement of a mobile beam that needs position repeatability.

PRIOR SOLUTIONS

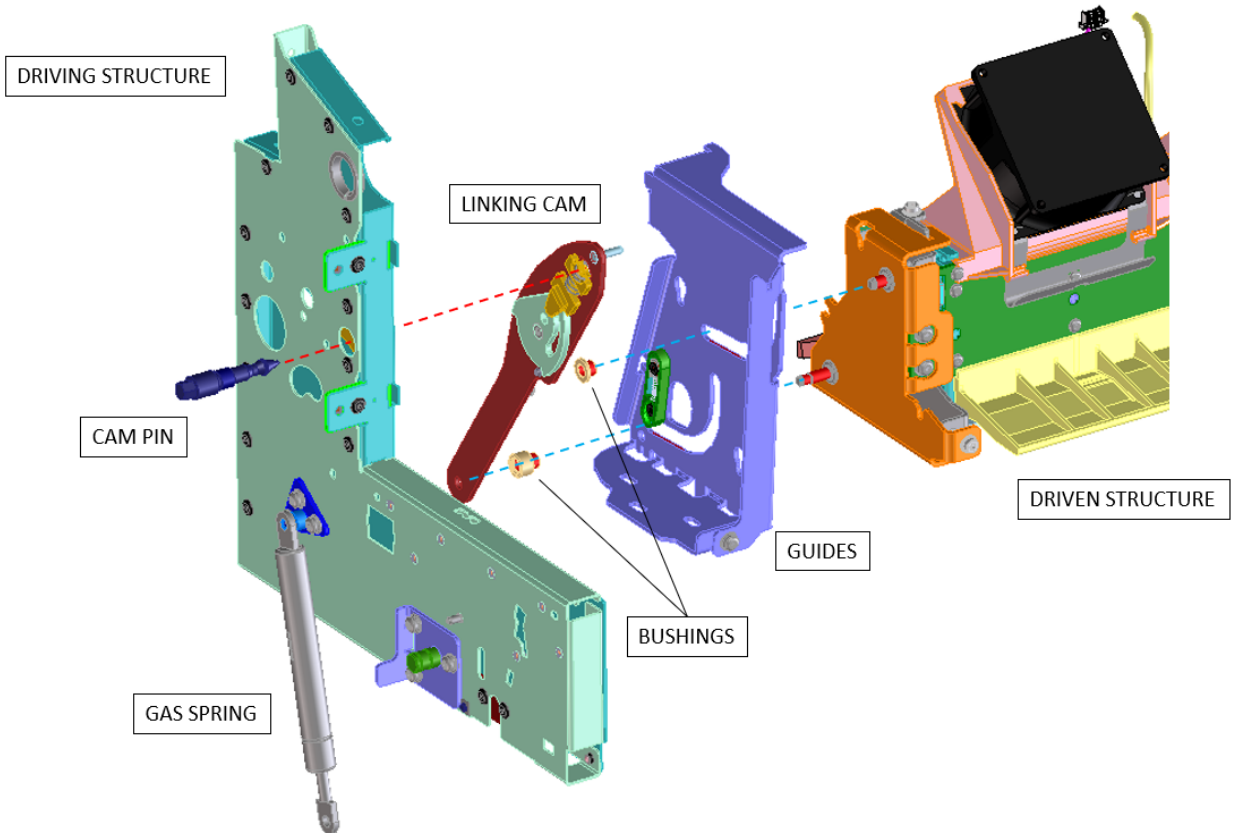
Other packed areas in PWA printers use independent motors to move different structures in order to generate the space to access.

For example, the printbar, capping system and spittoon are placed in another very packed area of the printzone. Each subsystem has at least one motor and they move in a coordinated way to avoid crashing at each other and give jam access when necessary.



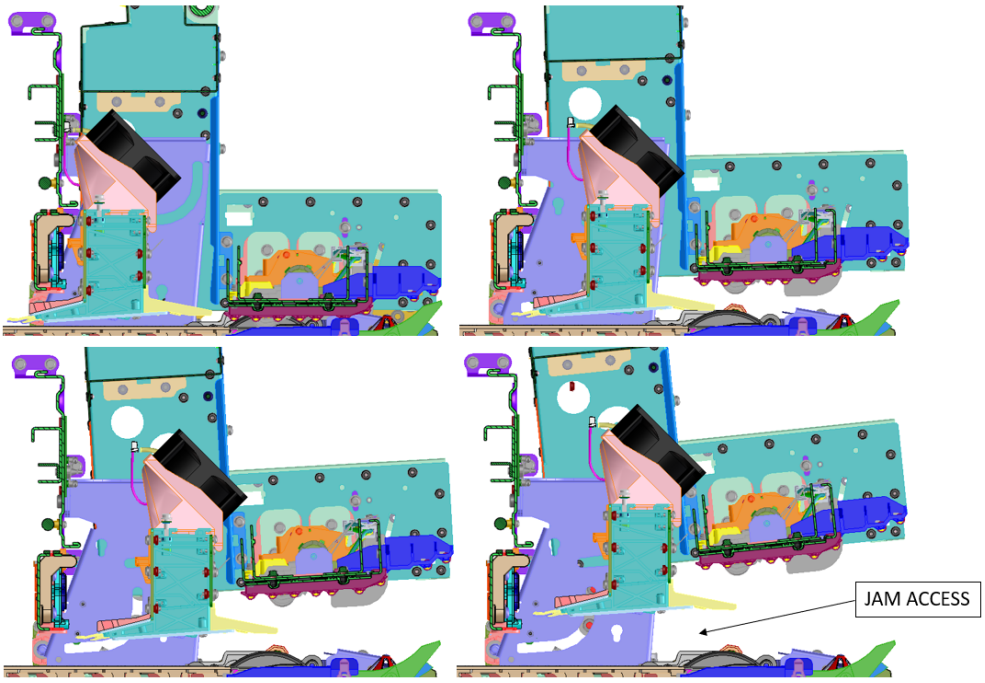
DESCRIPTION

The solution in this disclosure proposes a system formed by two mobile structures, linked to one another. One of them is lifted by an active or passive system (spring, gas spring, motor). The other structure is linked to the first one. The movement of the first structure is transferred to the second structure through cams and the path of the movement is defined by two linking cams (one on each side).



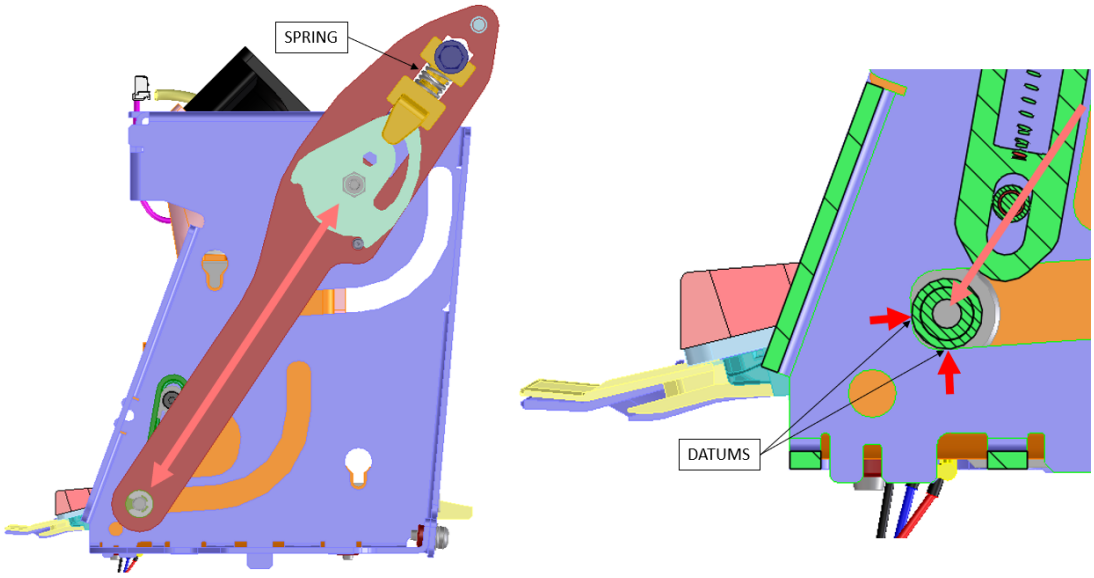
The driving structure is attached to the driven structure through linking cams. These linking cams are attached to the driving structure by the cam pins. Both structures can have different movement paths. In this specific case the driving structure has a translational circular movement defined by a parallelogram and the driven structure follows the guides path. The driving structure movement is triggered by a button or latch. In this case, a passive lifting system is used.

The guides path shape can be customized for the needs of the structure for service, clearance, etc… The paths help the driven structure avoid obstacles before rising up for the jam removal access. In this specific case, the driven structure has accumulated ink inside, and the paths avoid any possible ink spills by enforcing translation without rotation.

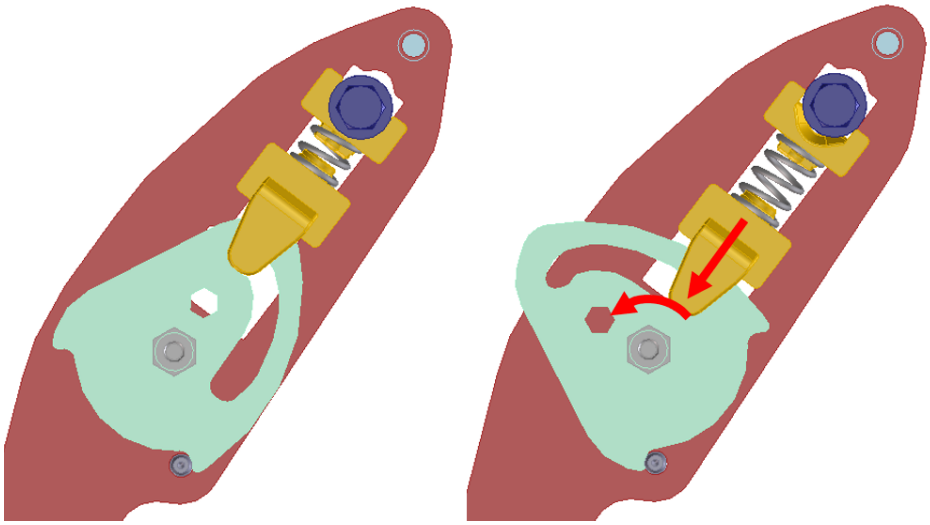


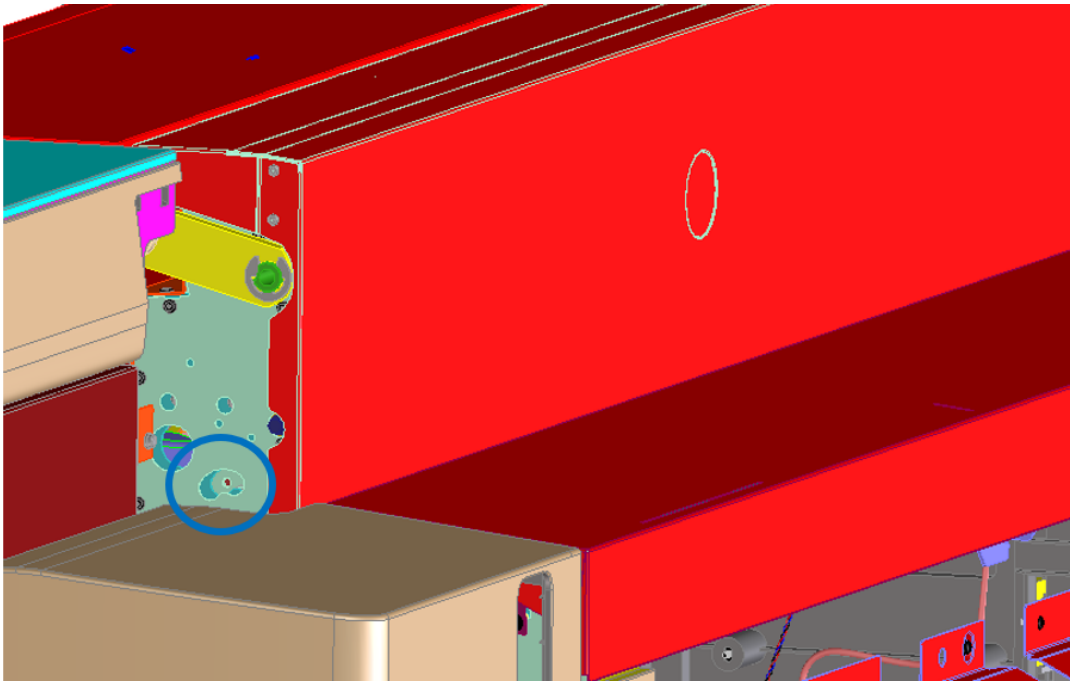
The guides paths are designed so that it cannot be automatically blocked by its own movement. To do this, the linking cam is always pushing or pulling in the guide general direction.

To ensure the positioning of the driven structure, the linking cam has a preload that forces the driven structure bushings to contact the end of the guides path. The preload is given by a compressed spring. The loaded position is very repeatable. The guides or driven structure can be adjusted to have a precise position. This position will not be lost when opening and closing the movements, as long as the preload is active, making the driven structure touch its datums.



For assembly and service purposes, both movements can be unlinked to access both structures. In this case the lock/unlock system is made by a lever that unloads the spring against the cam pin, allowing its removal. This lever can be accessed from the outside of the printer with an allen key, so it makes it easy for the service technician to unlink the movements and access the structures.





ADVANTAGES

This solution allows a packed space inside a printer or machine, while allowing space to access so that the user can take out possible jams.

It also makes possible that the access is given by pressing just one button, and it avoids any active system (motor, PCB, cables, etc…), reducing the failure probabilities and customer service visits. Most parts are structural and the maintenance cost is very low.

The implementation cost of this solution is also low because it does not implicate firmware or electrical development.

The preload system ensures position repeatability of the driven structure, and the fact that the link between both structures can be removed easily facilitates the service of both structures.

In this case, the driving structure was an already designed structure inside the previous version of the printer. This reduced the investment costs for the full system, and the knowledge leverage from the driving structure reduced development times.

Structurally, this solution transfers the torsion rigidity of the driving structure to the driven structure, needing only the driving structure to be rigid in terms of torsion.

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