

Automated screw process device with feed unit

Description of the problem

In order to adjust a plate rail in an aluminium attachment a grub screw DIN EN 27434 is used to fix this plate rail.

Because of the impaired motor skills of the workers the problem is to screw in the grub screw rectangular into the aluminium attachment. In addition the disabled persons have the difficulty to fix the little grub screws by hand. Therefore a certain amount of parts don't meet the criteria for the standard of quality.



Figure 1: Simple screw process device

Therefore the students from the Vocational school of Weissenburg developed already a simple screw process device. In a next step students developed an automated screw process device with feed unit. This will help people with severe disabilities to fulfill this work.

Description of the solution

Various trials with different test models were necessary to find a solution for separating and positioning the grub screw. This is very difficult because of the shape of the grub screw.

The separation of the grub screw was solved by a rotary disc with certain holes. The worker has to sort the grub screw manually into the holes.

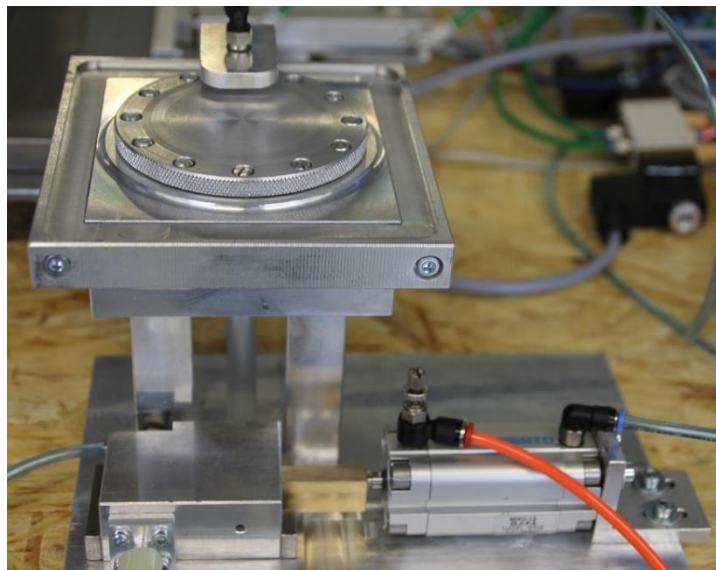


Figure 2: Rotary disc to separate the grub screws

Another component of the automated screw process device with feed unit is the magazine for the plate rails and the fastener for the pneumatic screw driver. Various sensors had to be integrated to check the charging level of the magazine and the end positions of the pneumatic cylinders.

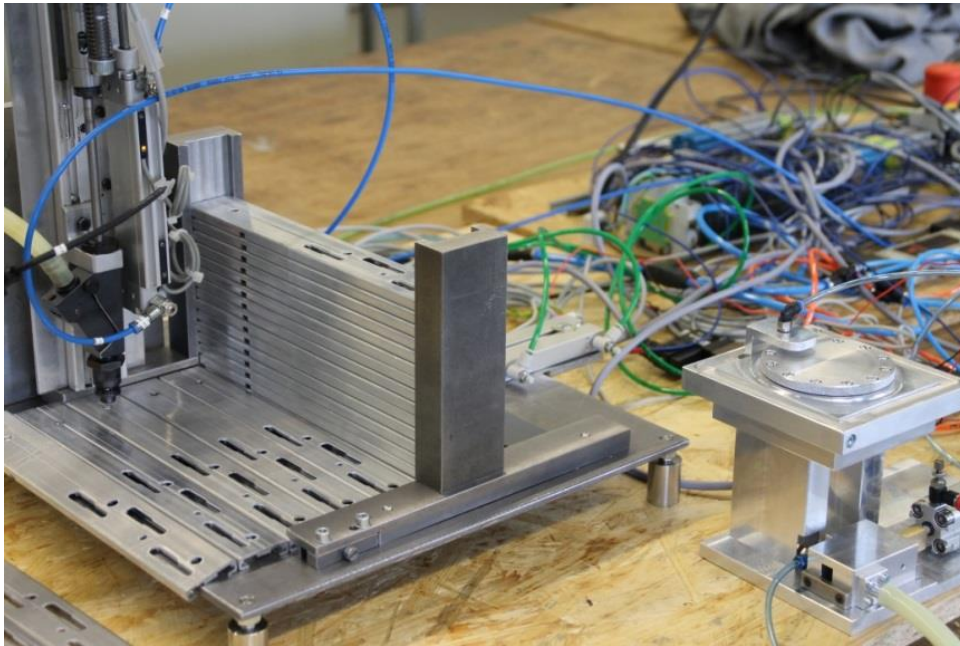


Figure 3: Magazine for the plate rails

With the new device worker only has to sort the grub screws into the rotary disc, turn the disc one step further to the next position and press a button to start the screw process. When turning the disc the next screw falls down into a hose where a sensor signals that a screw is available. Via compressed air the grub screw will be shot through the hose just to the right position for the pneumatic screwdriver. A sensor signals the right position of the screw and the screw process get started.

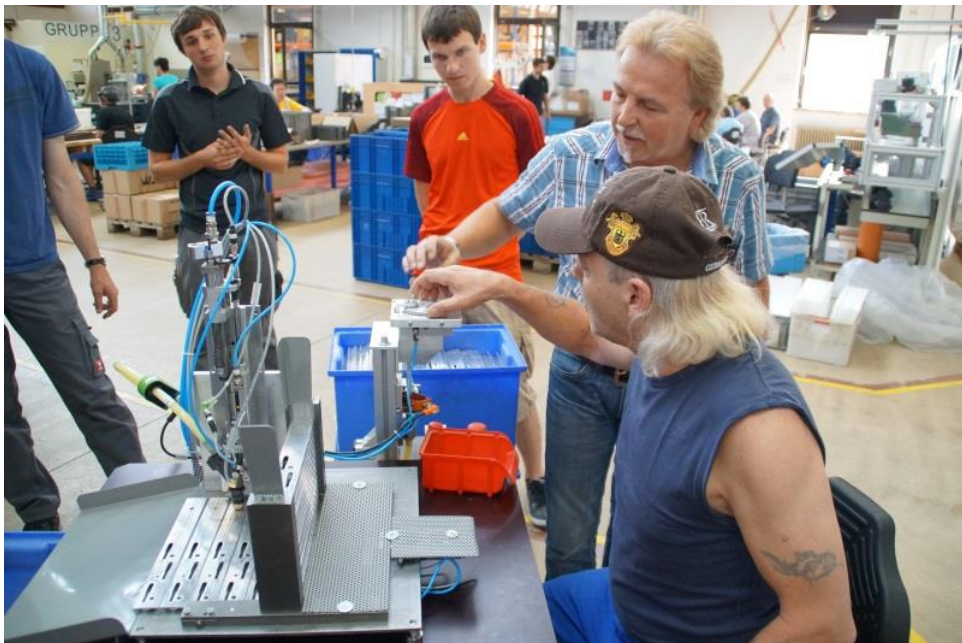


Figure 4: The new device in use