



**CMS**  
**BARREL MUON**  
**DT CHAMBERS**

*Tools at Aachen*

*Hans Reithler*  
*000605*

**4 tables** delivered and adjusted... fine tuning *still* in progress;  
supports for coordinatographs mounted; start cabling

**4 Coordinatographs:** first <sup>one</sup> moved from lab to final table;  
continue testing software, integration, etc.  
Delivery of other three *delayed* to end of June.

**3 Gluing tools:** produced; finalize precision assembly (on table)

**Glue dispenser** delivered and tested; continue commissioning on equipped table.

Measuring head produced;  
continue commissioning on equipped table

**Wire crimping machines for all sites:** produced, tested and shipped.

**Wire tension meters for all sites:**

Single channel units produced, tested and shipped.

64-Channel units under long term commissioning at Aachen;  
upgrade of software

Optical **wire test bench** produced, tested and running.

Future: **urgent needs** are

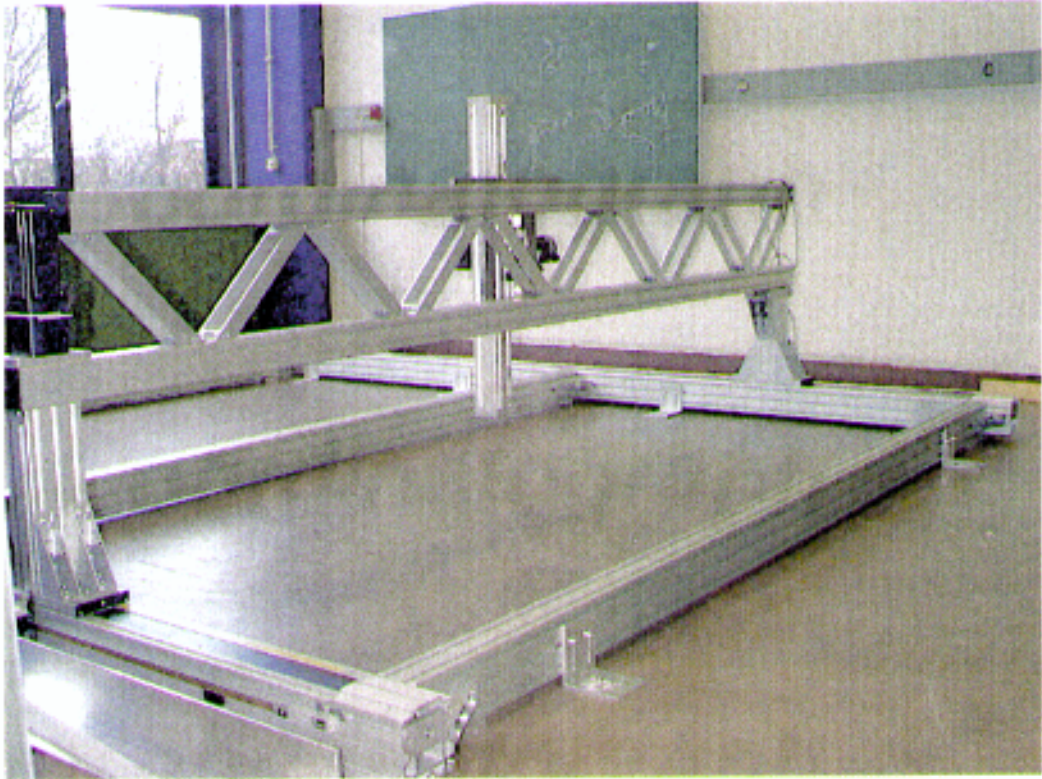
- \* complete **executive drawings**
- \* **further smaller single tools** (e.g. for RPC fixations, frames,...)
- \* **all materials**, raw and preassembled



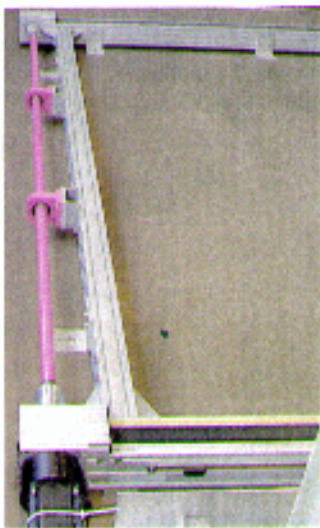
*Precision tables for the chamber assembly.*

*On the first see the coordinatograph mounted; on the fourth see one part of a gluing tool being placed for final precision assembly; two further gluing tools are visible on the floor behind the tables.*

Status  
Febr 2000

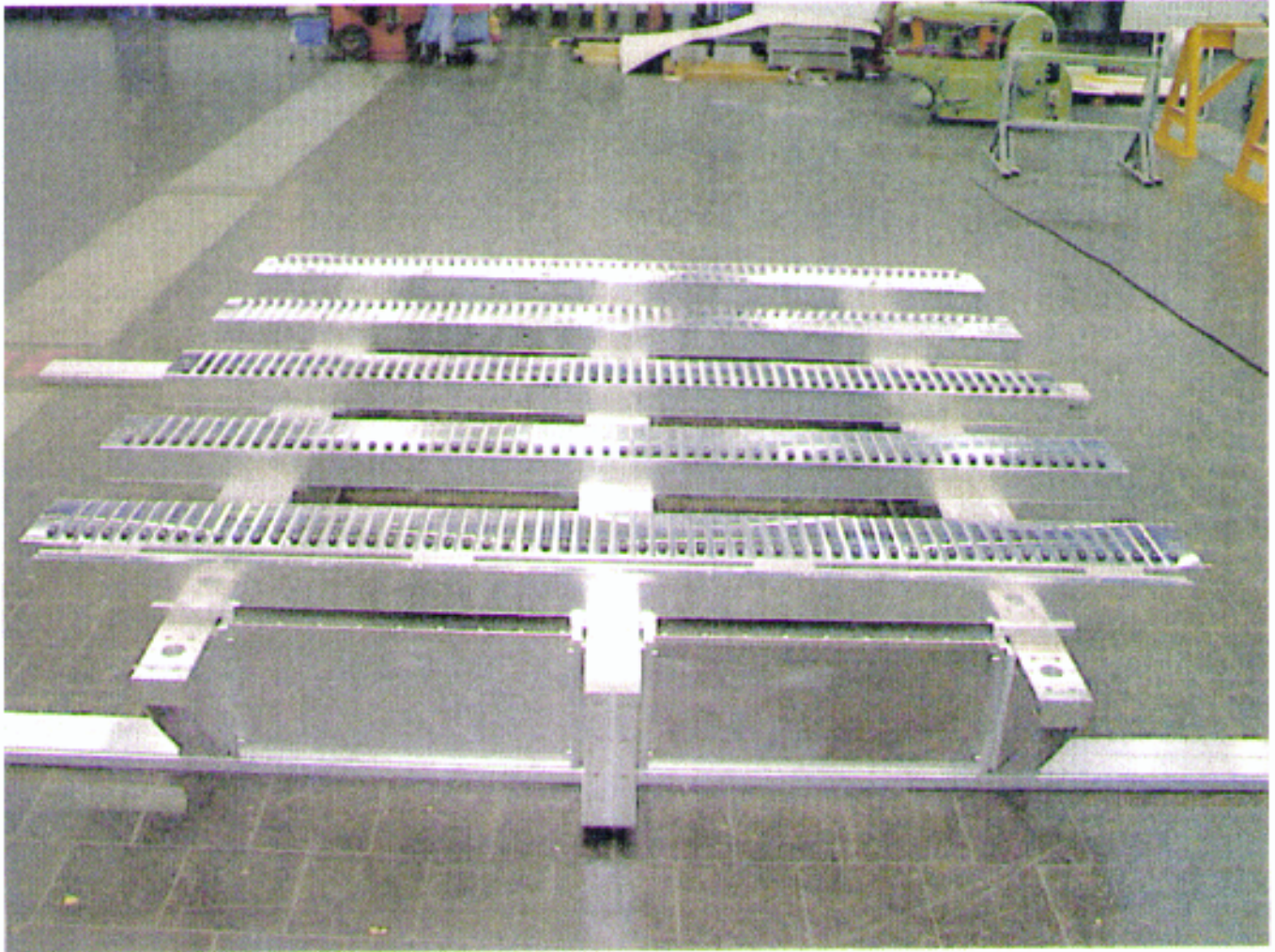


*Coordinatograph test assembly on floor*



*Coordinatograph driving units for x, y and z axes,  
and position measurement strip*

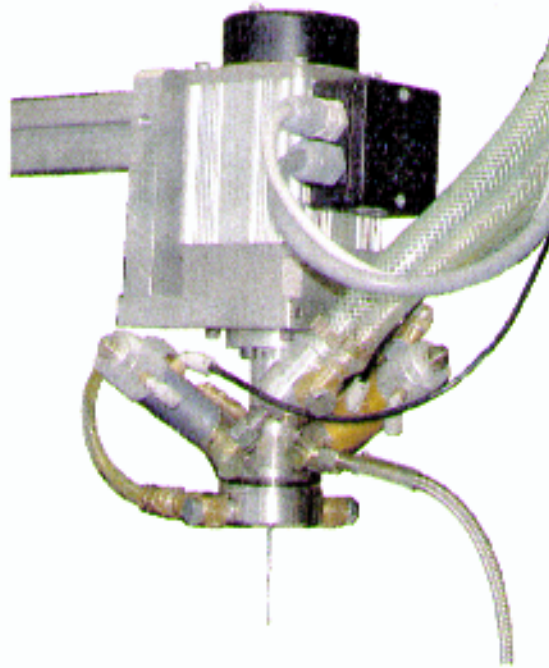
Status Nov. 1999



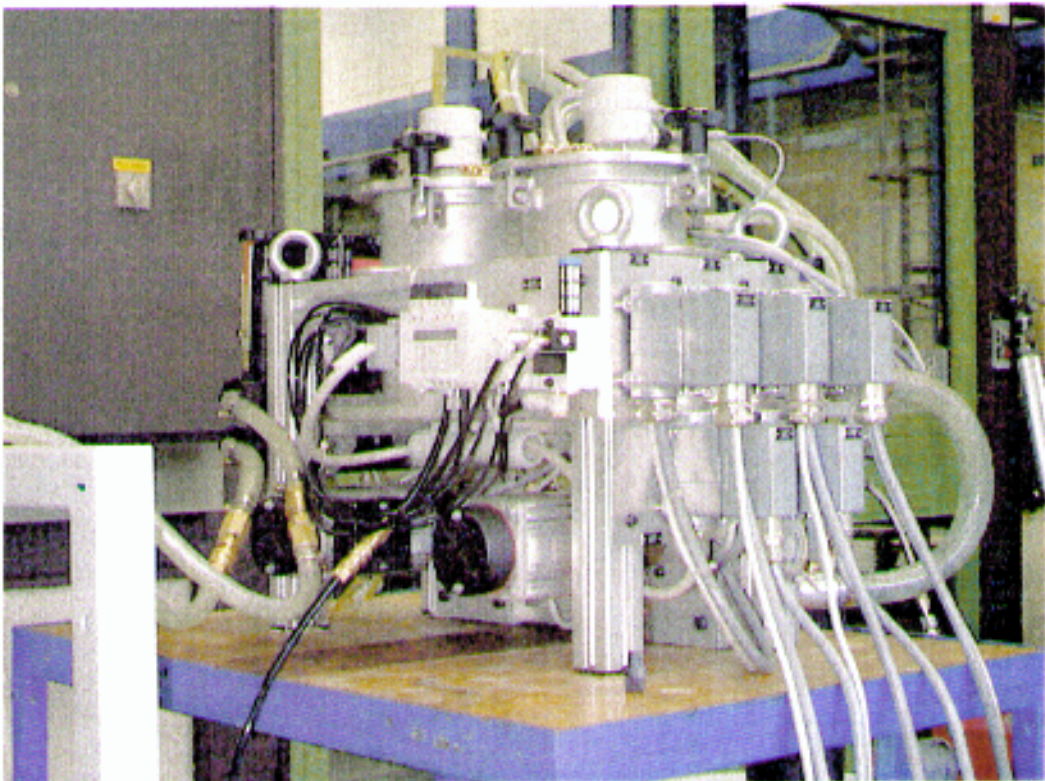
*Gluing tool holds all I-beams of one layer at nominal position while they are glued. There are three at Aachen.*



Status Febr 2000

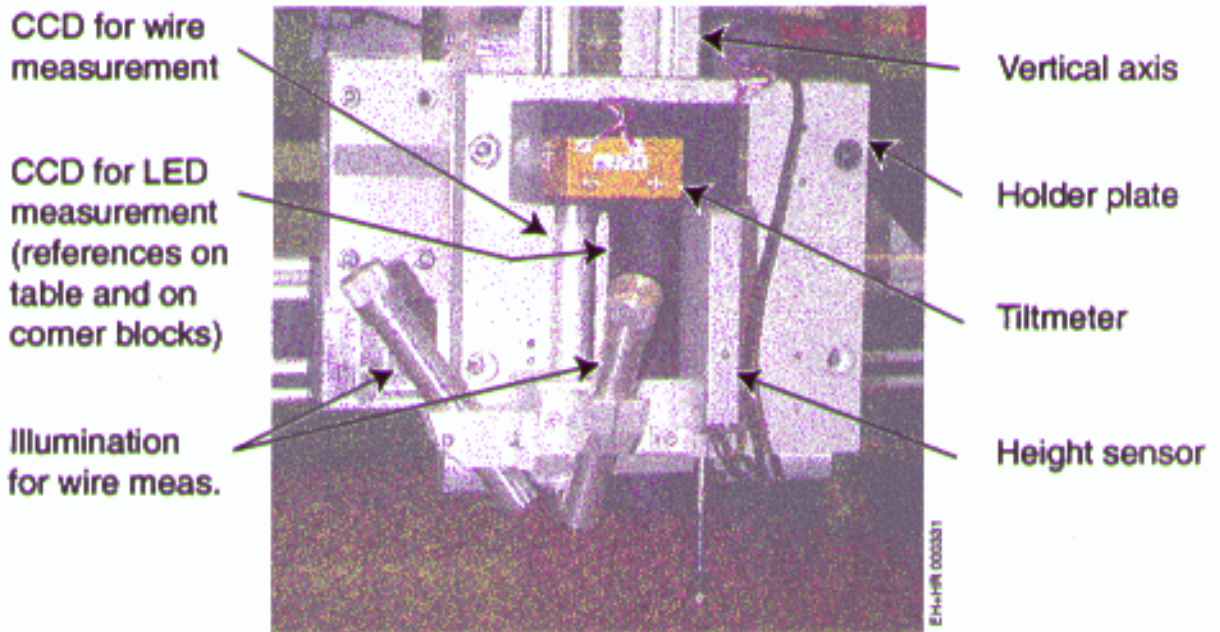


*Head of glue dispenser*



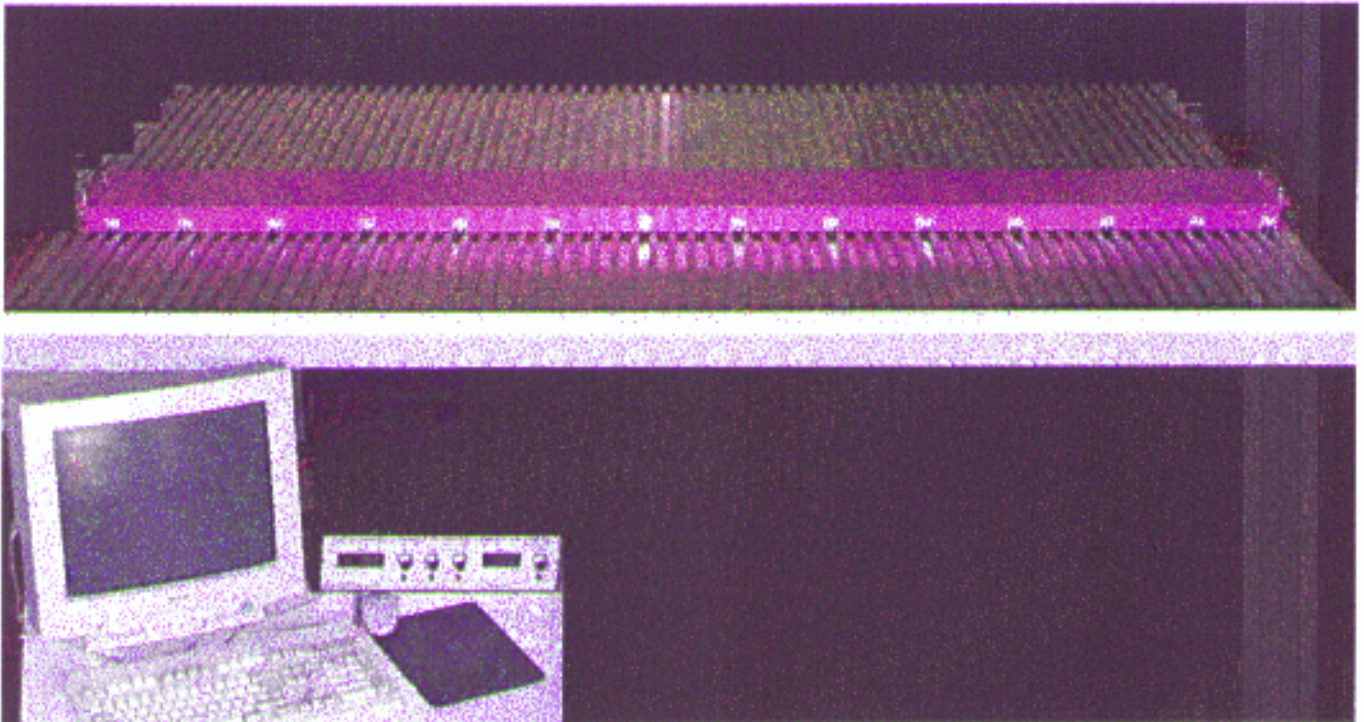
*Glue dispenser: reservoirs, heating, pumps and motors*

Status Febr 2000



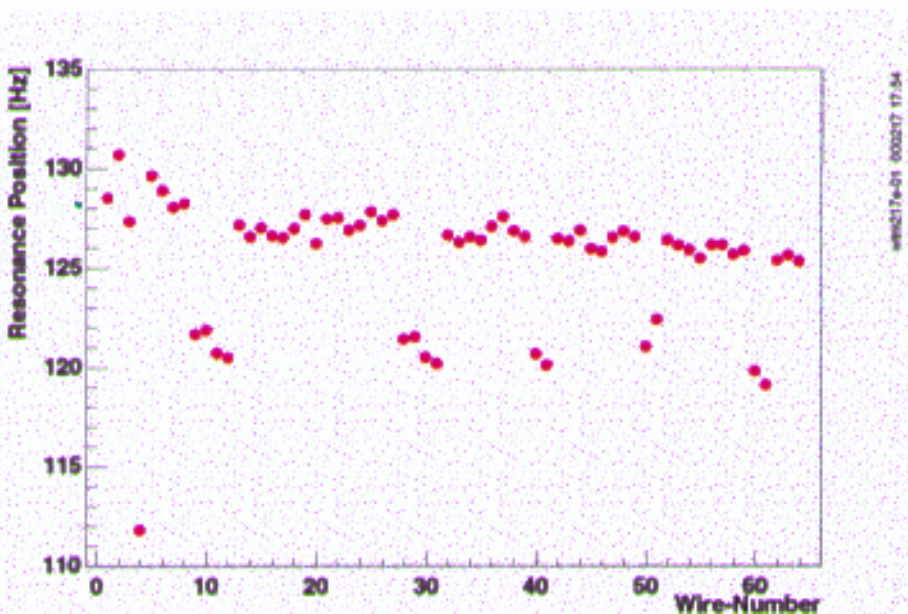
## *Measuring Head.*

*One CCD camera (left) measures the position of the wires, helped by a local source of light. A second CCD camera (right) with a different optics measures the position of reference points on the table and on the corner blocks. Also visible is a tiltmeter for correction of paralaxe. A height sensor is shown mounted on the head. The measuring head is about 20 cm high. Not shown is a small box housing some electronics.*



*The 64-channel Wire Tension Meter in action.*

*The 2.7 m long box with the 64 sensors (pink) is posed on the open layer of drift cells. On the small table see the WTM64 electronics (right) and the computer (left). Measures resonance frequencies to better than 0.1 Hz i.e. 0.1%.*

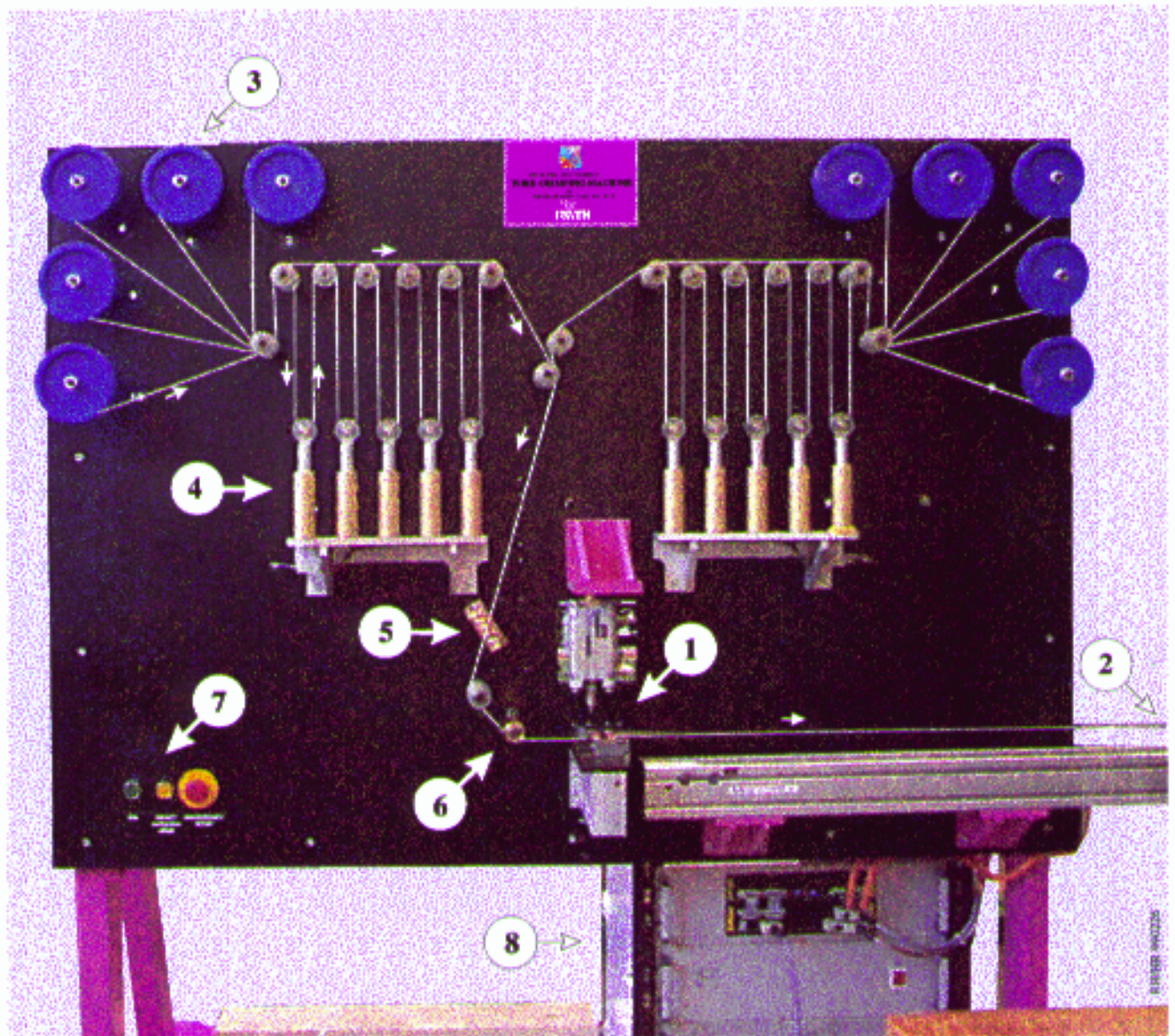


*Frequency of 170 wires, measured 170 times.*

*Errors are smaller than the dots.*



Status 1998



### *Wire Crimping Machine.*

*Ten wires are crimped automatically, at both ends, to nominal tension and length on this machine, then transported to the chamber and placed manually on each drift cell of the open layer of cells.*

