

### ADVANTAGES

#### **Quick in cooling down**

One important advantage of the Thermostep is the short time of cooling down.

Generally when furnaces are cooling down the cooling rate in high temperature range is quick but in low range is extremely slow. The smaller the difference of temperature between furnace block and environmental air the slower the cooling rate. So, TGAs cool down quickly from 1000°C to 400°C but in the lower temperature range they need ages to cool down to 60°C even with open furnace. The Thermostep solves this problem by automatically lifting a blower from the lower cabinet part blowing air along the carousels and the lower furnace heating surface reaching the opened upper furnace part to also accelerate its cooling down. Therefore the Thermostep cools down much faster than any other TGA enormously reducing the waiting time for the start of the next analysis cycle. Please see the graphic.

#### **Furnace design provides best purging**

Dual-type-furnace. The lower part of the furnace is flat and the upper part is deep and seal on top. This prevents the hot gases from escaping out of the top. TGAs with flat upper furnace part like lid allow gases to escape all around the lid. Additionally the same TGA design has a big hole in the middle of the upper furnace part !! Unbelievable but true. This open-top design allows gases to escape like from a chimney and consequently equal amount of air enters from the bottom through the openings around the carousel's shaft and around the balance pedestal. It is easy to imagine that when purging such kind of furnace with nitrogen or oxygen, there is much more air in the furnace than purging gas.

**Software temperature regulator.** The Eltra ThermoStep has the temperature control integrated in the software. This avoids the necessity of additional built-in hardware temperature controller. Otherwise the customer has to pay the hardware temperature controller once when he buys the analyzer and to buy it again each time it breaks. A software temperature controller requires only a simple solid state relays as hardware.

#### **Precise positioning**

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The ThermoStep employs a stepping motor with high precision gear resulting to a resolution of 1600 steps to turn from one crucible to the next, and to a total of 32000 steps for a full rotation of the carousel. A motor without gear provides a resolution of only 40 steps between two crucibles i.e. **40 times** lower resolution than our ThermoStep.

## **Multilanguage software**

The ThermoStep software can certainly be obtained in all main languages.

## **Ergonomic**

It is very easy to put the samples into the crucibles of our ThermoStep because the

carousels are not hidden deep in the lower furnace part. Please see our photograph (No.2)

The carousels of the ThermoStep are standing free enabling easy free access for the

Operator in contrary to designs hiding the carousels deep in the furnace.

## **Crucibles selection**

For the Eltra ThermoStep are ceramic as well as metal crucibles available.

## **Rotation sensor**

The ThermoStep employs an inductive sensor which in combination with the software monitors the carousel's rotation so that any possible problem with the carousel rotation will be immediately reported. This security measure is initially developed for Eltra TGAs which are especially designed for automated TGA analyses where the safety requirements are extremely high.

## **Balance purging during temperature ramping**

We don't take weights during heating up because normally weights are not interesting during these periods. For example for coal analysis the users are interested in moisture, volatiles and ashes but for nothing else in-between. You can not accurately measure any value anyway when the temperature is changing.

If even though anything in-between should be measured, this can be entered into the application which the user can design anyway. The big advantage of not taking values between measurements is that the balance is purged during this period. The biggest risk of contaminating the balance is when heating up before moisture stability and when ramping the temperature before measuring volatiles. The water escapes of course before stability and the

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major amount of volatiles escapes before the 7 minutes of measurement. Similar situation before ashes. Weight stability means no more material escapes from the sample i.e. no risk of contamination, while during weight loss the risk of balance contamination is high.

During those risky periods instead of reading not interesting weights we purge the balance to avoid contamination. When purging the balance it is not advisable to read weights because the purging disturbs the quite sensitive TGA balance.

The balance purging does not mean any additional gas consumption. The purge gas which is anyway required to purge the furnace is first passed through the balance. After the gas exits the balance it enters the furnace to purge it according to the requirements of the norm of the corresponding application.

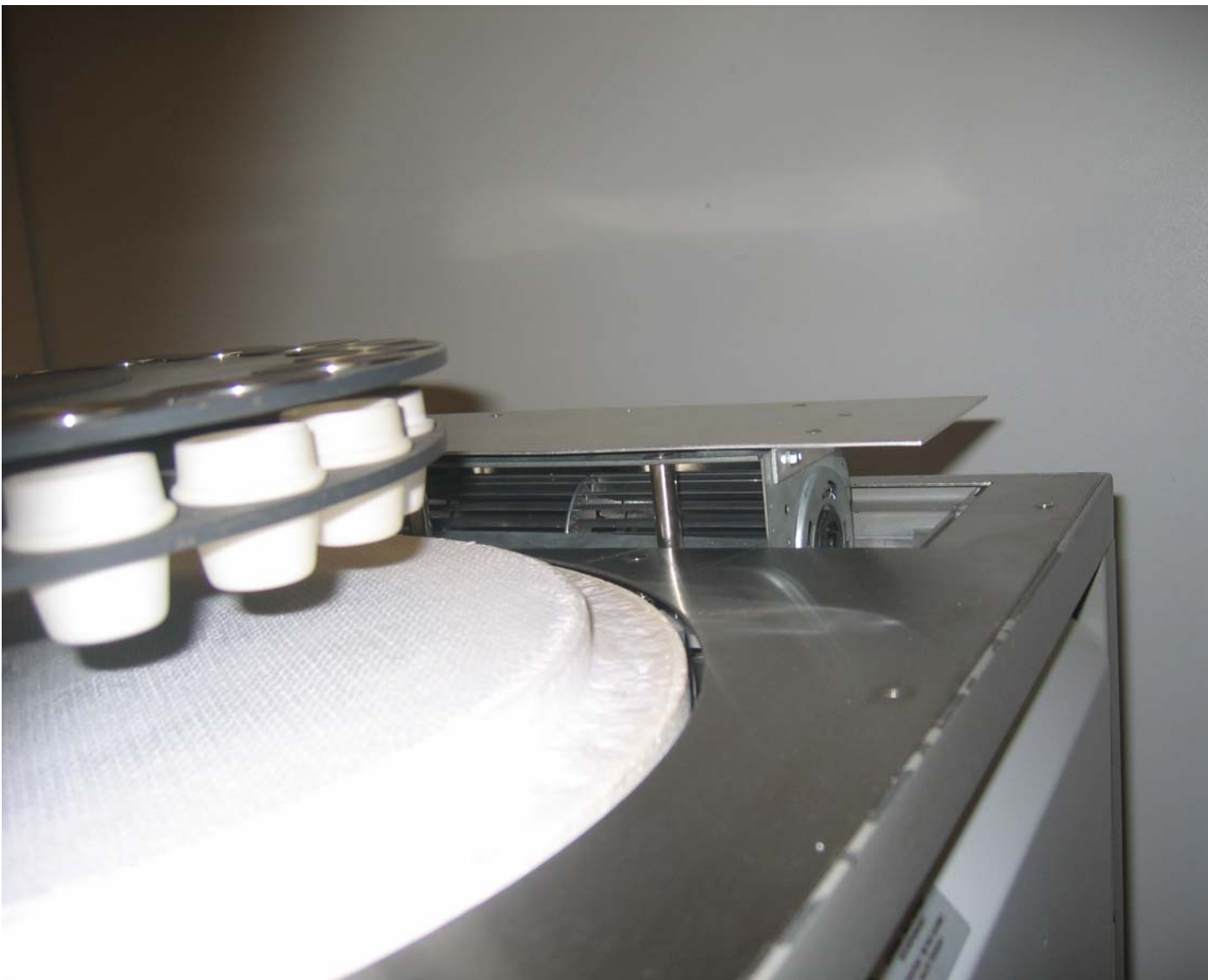
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# ELTRA



Photo No. 1

# ELTRA



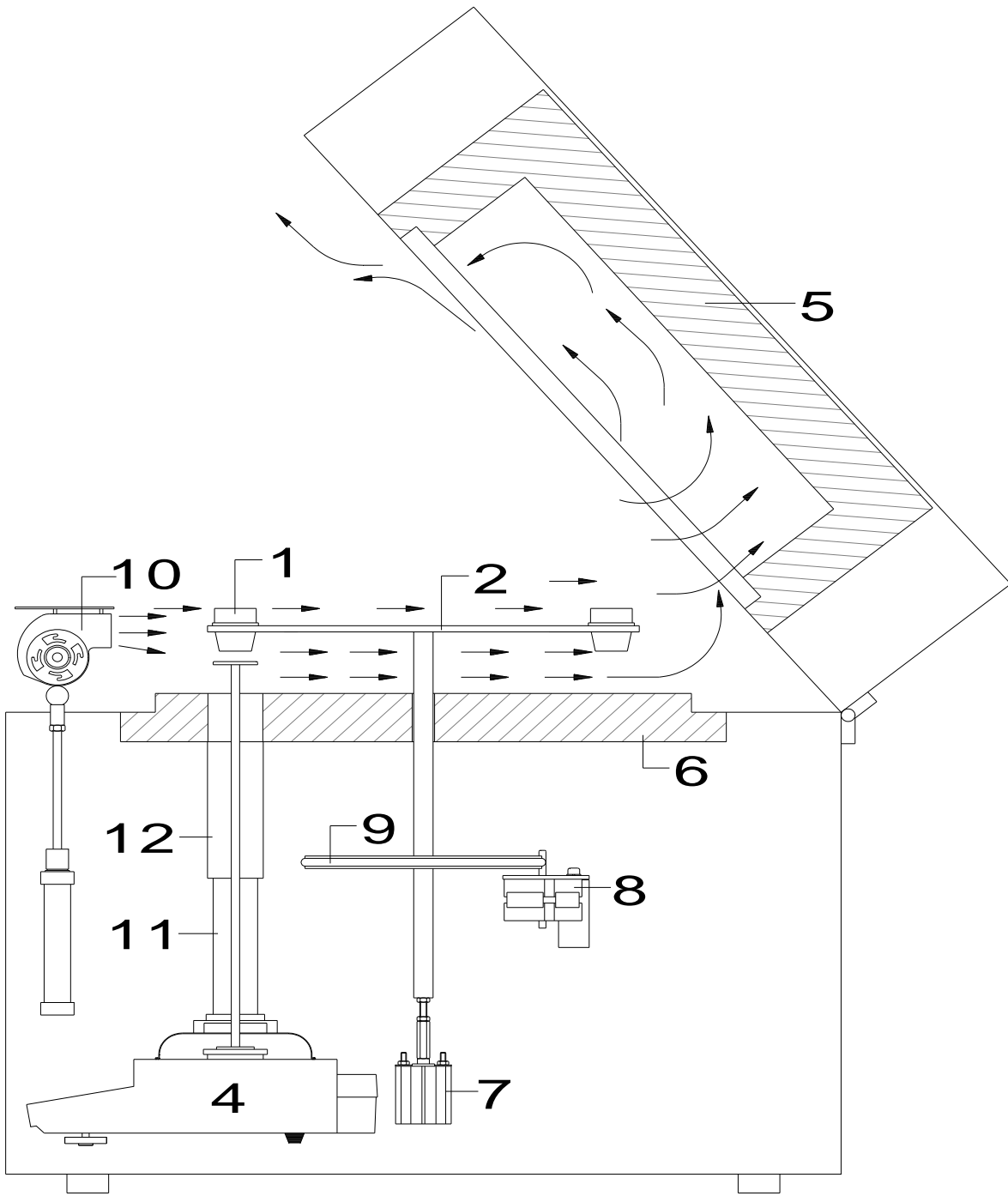


Fig.3

**ELTRA**

