PROJECT WORK

"DESIGN OF A MECHANISM TO IMPROVE THE PERFORMANCE OF A POLYMER BRABENDER MACHINE"

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Introduction

This semester we have been working on a polymer laboratory of the Hogeschool Gent. There, we are assigned the task of working with a Brabender machine, which is for the manufacture of plastics, to make our project work.

-Brabender UNIVEX-TAKE OFF T300A electronic (OHG Duisberg)

The Univex can take off, cool, and wind up flat films up to a max. film speed of 30 m/min.

The Univex can be controlled manually or through the PC (via CAN bus).

Liquid temperature conditioning of the nip rolls, positively influence, for example in the crystallization processes.

The flat film take-off is a compact, freely movable downstream unit allowing for both horizontal and vertical film take-off.

This, together with the installed heating/cooling facilities, makes the flat film take-off perfectly suited for a wide range of polymer melts.

The nip rolls have a speed advance to ensure tight film guidance. The torque-controlled winder is equipped with a traversing film guiding device for uniform and space-saving winding.

Unilateral support of rolls and guide rollers provides easy threading of the film. The significance of this line goes, however, clearly beyond the application as a simple take-off and winding unit. The special film guidance between the two pairs of rolls enables the use of a film test line, i.e. optical film purity inspection by means of an installed Film Quality Analyzer FQA. A glass door ensures dust-free operation.

The design of the flat film take-off enables the installation of further test instruments like hazemeter, NIR systems for density or additive determination, etc.

Like all new developments of Brabender®, the flat film take-off is equipped with CANopen fieldbus technology.

Used- C.W. Brabender Univex Lab Take Off. Approximate capacity speeds of up to 30 meters per minute. Consisting of (3) 4” diameter x 8” wide chrome plated, manually adjustable cored rolls, and a top mounted take up roll. Middle roll only, and take up driven by a 1/29 hp, 130 volt DC gear motor. Includes a Bodine type FPM adjustable speed/torque control. Mounted on frame with casters.

PROJECT WORK

Like we are students of Mechanical Engineering, our mission was to resolve a deficiency of this matter who had it, designing a new system for it.

The problem was the next:
As can be seen in the pictures, the machine consists of three cylinders by circulating the plastic to get, and the problem is that the system used to maintain a fixed distance between them (that we want plastic for finishing) , is not very reliable since it easily becomes unbalanced, making it impossible to work.
Therefore, our work in this project is to devise some method or mechanism to verify that the distances are correct all the time.

Finally we come to two conclusions:

-The first of these is subject to change the springs, that are a little outdated, with new ones that allow us to work properly:

Here are some of the catalogs found in the network:

http://www.grainger.com/Grainger/Extension-Spring-3HPU1?Pid=search

http://www.filame.com/en/springs.html

-The second is a bit more complicated, because we have designed a completely new mechanism by three gears:

Moving the knob, the gear assembly starts to work, and trough two transmission rods the circular movement becoming in lineal movement and begining the rollers displacement. In this way, we are able to solve the calibration problem and we get the distance we need between the rollers.

Below we show some drawings to explain how the mechanism works.

Bibliography

Springs

http://www.filame.com/en/springs.html

http://www.kessen.be/

http://users.skynet.be/visserieguerry/

http://www.grainger.com/Grainger/Extension-Spring-3HPU1?Pid=search

Bravender UNIVEX-TAKE OFF

http://www.youtube.com/watch?v=mNI0TwHKNi4

http://www.brabender.com/english/plastics/products/extruders/downstream-equipment/flat-film-take-off.html

http://www.youtube.com/watch?v=U5JrQeJHTNM

(http://www.aaronequipment.com/usedequipment/plastic-sheet-extrusion-lines/sheet-extrusion-lines/brabender-05-92-s53-43422002)

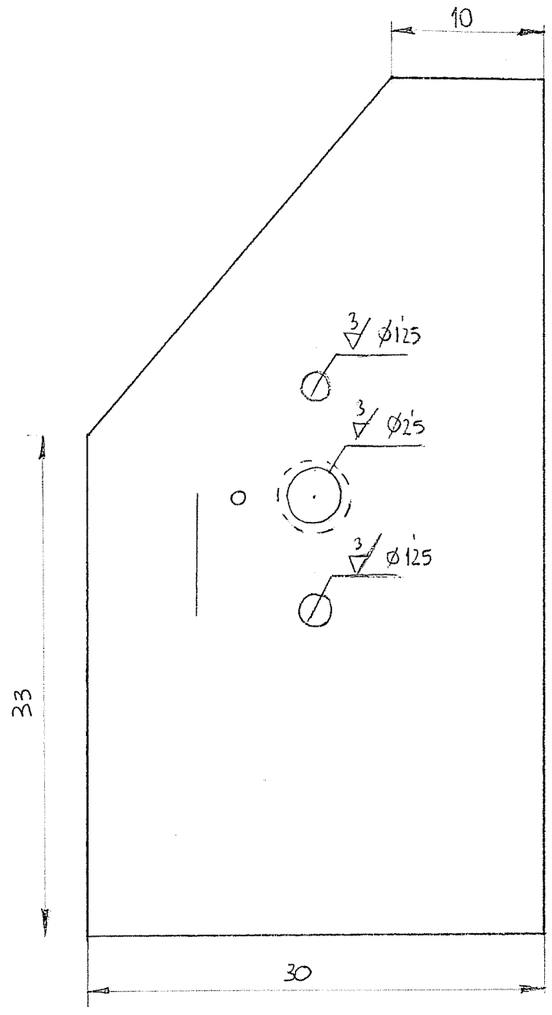
http://www.gig.etsii.upm.es/gigcom/temas_di2/engranajes/tablas%20en_planos.html

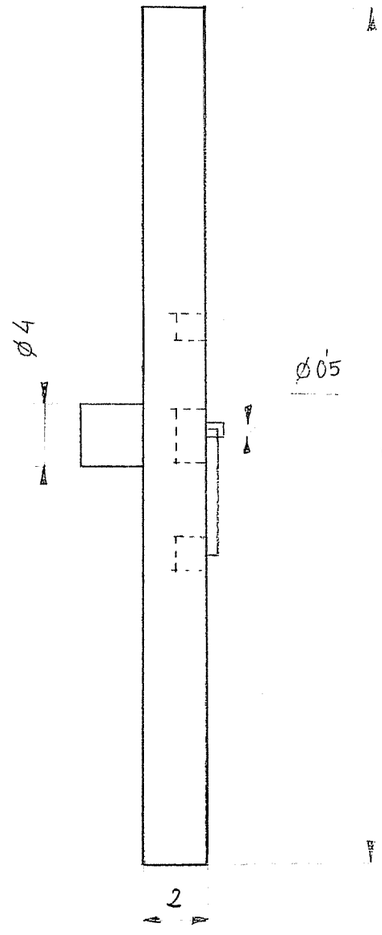
Other links

http://www.iso.org/iso/home.html

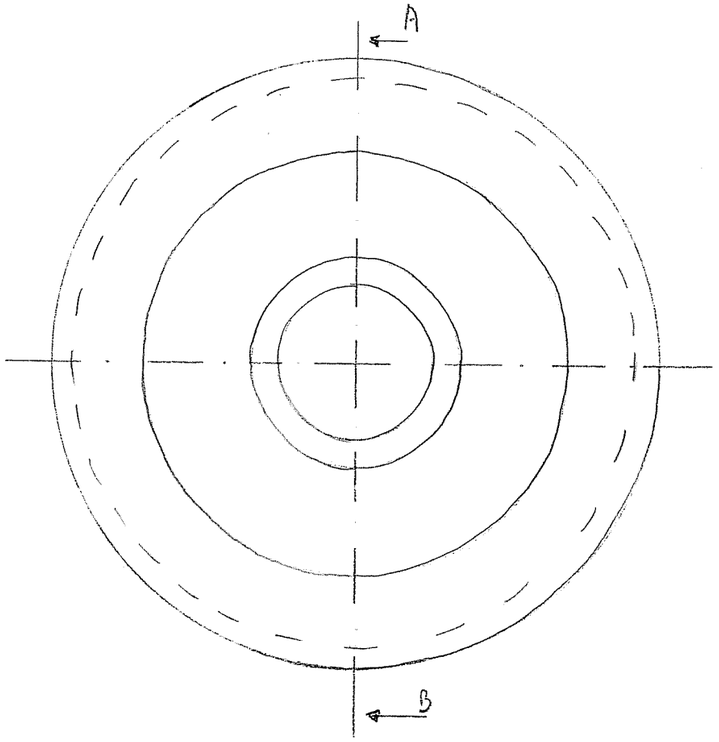
http://store.curiousinventor.com/guides/Metal_Working/Screws/

* CARCASS $\frac{10}{\nabla}$ ($\frac{3}{\nabla}$) (SCALE 1:4)

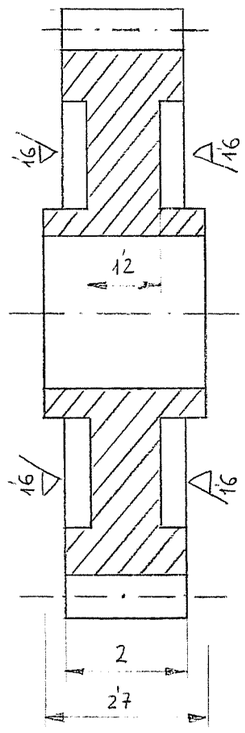




✳ CENTRAL GEAR $\frac{5}{\nabla}\left(\frac{16}{\nabla}\right)$ (SCALE 1:1)

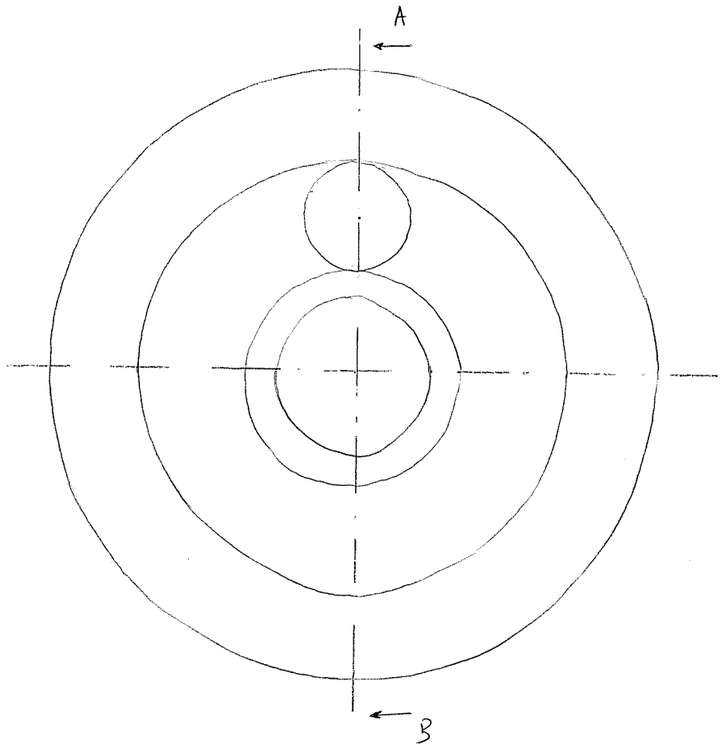


A-B

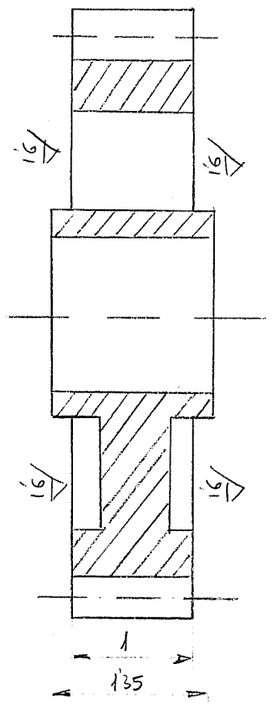


NORMAL MODULE	3
NUMBER OF TEETH	30
ZIP	UNE 18016
ORIGINAL DIAMETER	9'4
OUTER DIAMETER	10
INNER DIAMETER	8'7
ADDENDUM	3
DEDDENDUM	3'75

✳ TRANSMISSION GEARS ▽5 (▽16) (SCALE 2:1)

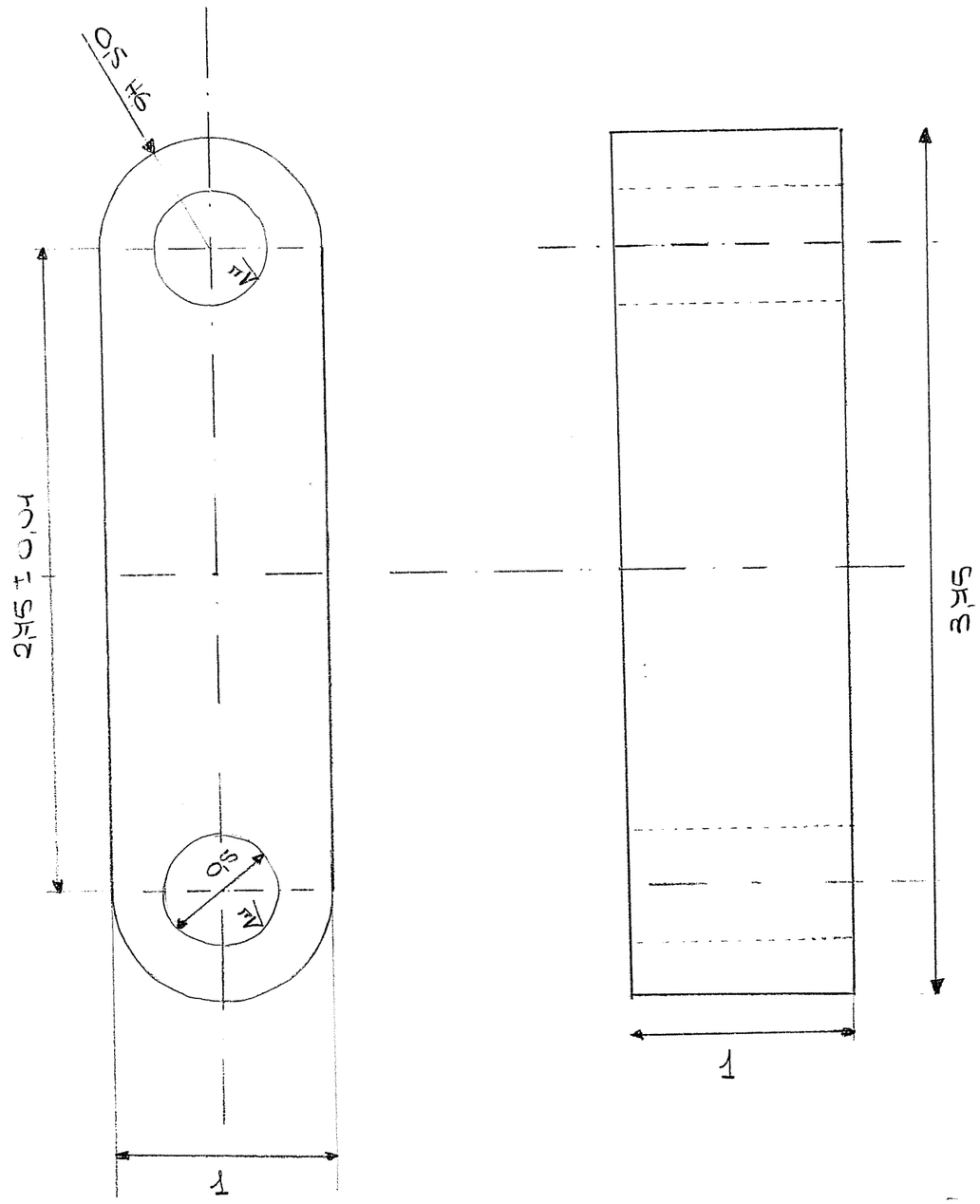


A-B

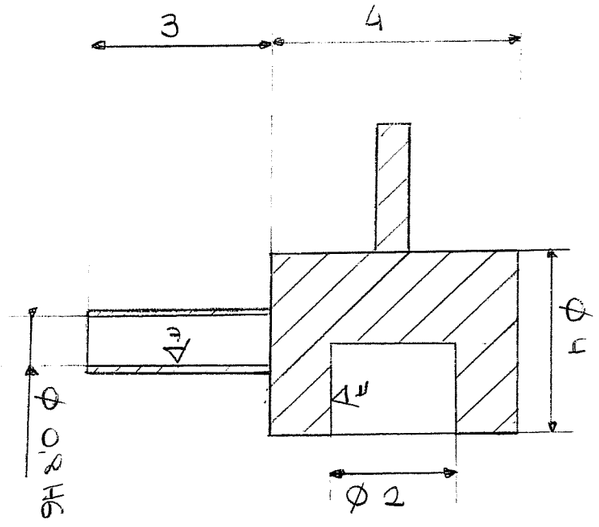


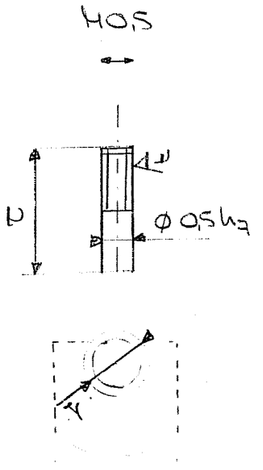
NORMAL MODULE	3
NUMBER OF TEETH	15
ZIP	UNE 18016
ORIGINAL DIAMETER	47
OUTER DIAMETER	5
INNER DIAMETER	4'35
ADDENDUM	3
DEDDENDUM	3'75

* CONNECTING ROD $\frac{8}{\nabla}$ ($\frac{1}{\nabla}$) (SCALE 4:1)

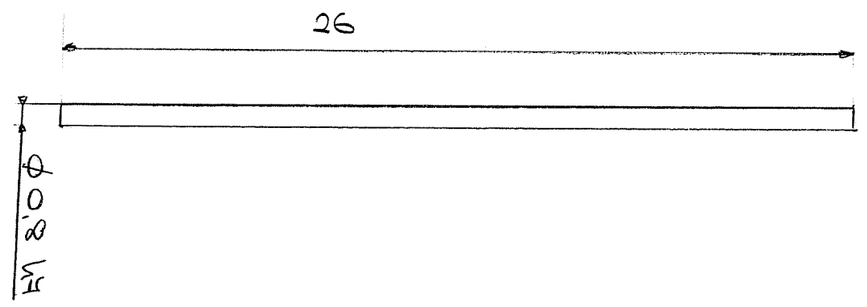


SUCTION (SCALE 1:1) A5/A4

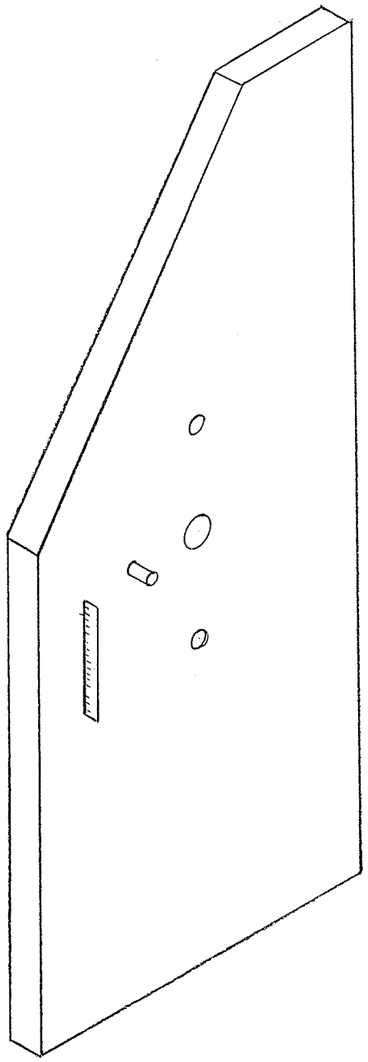




ROD (SCALE 1:2) A5



✳ SPACE VIEW (SCALE 1:4)



✳ SPACE VIEW (SCALE 1:1)