The invention describes a heat insulating window with incorporated micro-blinds, where the position of the micro-blinds can be controlled from outside. The heat insulating window described in the invention enables the position of the inside micro-blinds to be adjusted from the outside, by turning a rosette (17) that turns a cylindrical magnet (15) with transversal polarisation, located inside the window on a shaft (3) on which two drums (4) are fitted, holding the higher ends of two ladders (6) supporting the micro-blind blades; the shaft (3), the two drums (4) and the magnet (10) are located under the higher bar of the heat insulating window, inside an aluminium shape (1) in the form of an upside down "U" with loose edges, slightly bent towards the inside to hold two stands (2) where the drums (4) sit on microbearings (7).
Magnetic device for micro-blinds installed between insulated glasses

The invention relates to thermo-insulating window with incorporated micro-blinds controlled from the outside, having various applications in households.

It is known a thermo-insulating window having lamellar blinds positioned in the space between the two glass panels, the blinds being lifted or lowered using two central pull strings, and they rotate by action of two ladders, using an inner mechanism located in the upper side of the window, and a slide located laterally and equipped with magnets, to which the ends of the central strings are attached and through which the two strings of the ladders are passed - one is loose, while the other passes through a baffle pan, with the ends coming together on the pulley of a spring strainer located in the lower part of the window; the slide inside the window is operated from outside using a magnet slipper that slides face-to-face with the slide in a vertical slideway (patent AU 2005202192). The disadvantages of this device have to do both with the complexity of the mechanism - and implicitly, the large number of moving parts - and the fact that the slide's friction on the strings and the strings moving on the spools result in the strings wearing quickly and breaking prematurely, which requires frequent repairs in a specialised shop or even replacement of the entire heat insulating window.

It is also known a heat insulating window having folded blinds in the space between the two glass panels, locked in the upper and in the lower side to two mobile horizontal bars with magnets on their ends; the two inside bars are magnetically coupled to the two outside bars of the same length, sliding up and down the window and moving simultaneously (patent US 6932139). The pull between the magnets of the inner and outer bars is sufficient to ensure friction of the bars on the glass panels, which prevents them from sliding out of the position in which they were intentionally set. Despite its simplicity, the device has one major disadvantage: it can only be applied to folded blinds, which in general are highly opaque.

The technical problem to be solved by the invention is to control from the outside the opening and positioning of the blinds inside the thermo-insulating window, without affecting the structure and tightness of the window itself. The thermo-insulating window with incorporated micro-blinds according to the invention is characterised in that the position of the micro-blinds inside can be adjusted from outside, by rotating a rosette that operates a cylindrical magnet with
transversal polarisation, which, through the magnetic field, engages another
cylindrical magnet with transversal polarisation, located inside the window, on a shaft
that has two affixed to it, to which the higher ends of two ladders are attached,
holding the micro-blinds blades in a known system.

The heat insulating window with incorporated micro-blinds according to the invention
has the following advantages:
- the simplicity of the operation of the mechanism, which has a direct influence on the
cost and, implicitly, on the reliability of the thermo-insulating window
- easy and safe handling.

One embodiment of the invention will be further described with reference to figures 1,
2 and 3, representing:
 Fig. 1 - overall perspective view of the heat insulating window with incorporated
micro-blinds
 Fig. 2 - extended view of the internal mechanism of regulating the position of the
micro-blinds
 Fig. 3 - extended view of the external mechanism of controlling the position of the
micro-blinds.

The heat insulating window with incorporated micro-blinds according to the invention
has the same basic composition as any other standard heat insulating window: two
rectangular glass panels secured to the frame by four aluminium bars reinforced with
four corner pieces. Also, the micro-blinds are made of equidistant aluminium blades
holding on two or more string ladders, in the form of the known system. An aluminium
shape (1), in the shape of an upside down "U" with the loose ends slightly bent
towards the inside is secured to the higher bar of the window by either an adhesive or
screws. The width of the shape (1) is slightly smaller than the distance between the
glass panels. Two plastic stands (2) are slid inside the shape at one end; the
transversal size of the stands fits exactly the loose section of the shape (1), and the
stands have a special pocket (a) supporting the micro-blind position adjustment
mechanism, which includes a shaft (3) that is fitted with two drums (4) that are each
provided with two blades (5) holding the two higher ends of a ladder (6) that holds the
micro-blind blades. The positioning and locking-in of the stands (2) along the length
of the shape (1) will be done so that the weight of the micro-blinds is balanced on the
stands. For the drums (4) to move as loosely as possible on the stands (2), two
micro-bearings (7) are fit at the ends of every drum (4) and sit in special pockets (b)
on the stands (2). The strings of the ladder (6) loosely pass through two holes at the base of the stand (2); a central pull string (9) is passed through another hole between these two and attached on the stand (2). The whole structure of the micro-blinds is realised in the known system; the ladders (6) hold the micro-blind blades equidistantly, while the central strings (9) loosely pass through holes in the blades and prevent them from sliding laterally; the only restrictive requirement is that the width of the blades must be smaller than the space between the glass panels, so that they can rotate loosely. A cylindrical magnet (10) with transversal polarisation is fit at one end of the shaft (3). The lower ends of the two ladders (6) and of the two central pull strings (9) are attached to an aluminium stick (11) that has a "U"-shaped section similar to the shape (1), but opening up. Two plastic pieces (12) with magnets (13) polarised transversally on the stick are inserted at the ends of the stick (11).

Outside the heat insulating window, in a position corresponding to the magnet (10), the micro-blind blade control device is affixed to the glass panel(;) the device is comprised of a plastic case (14) with a magnet (15) inside having a similar shape, size and polarisation as magnet (10); the ends of this magnet are fit in two sleeves (16), also made of plastic, which can rotate inside the case (14); one of the sleeves (16) ends outside the case (14) in a rosette (17) that can be easily turned with a finger. A bar (18) of similar construction as the stick (11) is placed on the outside, at the base of the heat insulating window; the bar (18) has two unconfigured magnets, placed face-to-face with the magnets (13) located on the stick (11).

The position of the micro-blinds is controlled by turning the rosette (17) with a finger in one direction or another; thus, rotation of magnet (15) engages magnet (10) to move, by interaction of the two magnetic fields; rotation of magnet (10) is transmitted by the shaft (3) to the drums (4) to which the ends of the ladders (6) sustaining the micro-blinds are connected, causing the micro-blinds to change their position. To lift or lower the micro-blinds, the bar (18) can be slid up or down, as desired; the magnets of the bar will interact with the corresponding magnets in the stick (11), which will follow the movements of the outer bar exactly. The pull between the magnets of the two bars is sufficiently high to create a friction that will prevent the stick (11) and the bar (18) from sliding on the glass and keep them in the position established by the user.
CLAIMS

1. Thermo-insulating window with incorporated micro-blinds, made of standardised components, characterised in that the position of the micro-blinds inside is adjustable from the outside, by turning a rosette (17) that turns a cylindrical magnet (15) with transversal polarisation, which, through the magnetic field, engages another cylindrical magnet (10) with transversal polarisation, located inside the window, on a shaft (3) on which two drums (4) are fitted, holding the higher ends of two ladders (6) sustaining the micro-blind blades.

2. Thermo-insulating window with incorporated micro-blinds according to claim 1 characterised in that the shaft (3), the two drums (4) and the magnet (10) are placed under the higher bar of the heat insulating window, inside an aluminium shape (1) in the form of an upside down "U" that has the loose edges slightly bent towards the inside, in order to hold two stands (2) where the drums (4) sit on microbearings (7).

3. Thermo-insulating window with incorporated micro-blinds according to claims 1 and 2 characterised in that the rosette (17) and the magnet (15) are placed in a case (14) affixed to the glass from the outside of the window, in line with magnet (10) inside, in order to create maximum interaction between the two magnetic fields.