MULTIWIRE CUTTER NDF-6510/15

1 - DESCRIPTION:

The NDF 6510/15 multiple diamond wire saw is a multi-wire machine designed to produce boards and plates of variable thickness from large blocks of granite and natural stone. This new unit represents the most modern technology regarding the primary sawing of stone blocks, becoming the alternative to the traditionally used sawing methods, since it improves the productive capacity quantitatively, efficiently taking advantage of the energy resources necessary to the production of materials and significantly reducing the production costs of the cutting phase.

The multiple diamond wire cutter is a machine that stands out for its efficiency and high productivity, designed to obtain high yields, characterized by its great robustness, thanks to its particular design that forms a compact, balanced and compensated set where all movements are concentrated.

The main structure of the machine is basically composed of two robust columns made up of mechanically-welded steel structures, connected to each other by an upper cross member. On both columns, the structure of the main flywheel carrier frame is mounted, which moves vertically supported on both columns on linear guides with linear roller recirculation skids and driven by a pair of rolled spindles with ball recirculation nut, synchronized and driven by two motor-reducers with independent servomotors for raising / lowering the wires with a smooth and precise movement, located at the top of both columns, the entire guide assembly is perfectly protected by PVC bellows. The servomotors are synchronized by software in the vertical movements that ensure smooth cutting, low consumption, and maximum precision and avoid backlash and problems of the central motorization with transmission and transmission.

The Ø1800 driving drum is made up of a single multi-channel pulley with 10 mm pitch grooves, and connected to the main motor by means of a pulley and toothed belt transmission. The threads are positioned manually depending on the desired thickness supported on one side of the machine on the driving drum, and in turn are tensioned from the opposite end by autonomous pulleys. The diamond wires are also guided by two small multi-channel drums that help to significantly reduce the sag produced by them.

From the end opposite the drive drum, the diamond wires rest on the set of idler pulleys, designed with a particular pivoting extraction system, which allows maintenance times to be significantly reduced.

Once the wires are located, they are adjusted with the tensioning device that acts individually on each of the tensioning pulleys, independently ensuring that each of the wires has the same tension regardless of the minimum differences in length that exist between each one of the threads that are installed in the machine. The tensioning system increases the useful life of the threads and therefore the profitability of the machine.

The entire machine is characterized by the robustness and reliability of the elements that make up, being all of it designed to withstand the toughest working conditions, and in this aspect it is precisely where we can contribute all the experience accumulated throughout the years that we have been designing and manufacturing machinery for this sector.

The new multitwire cutter NDF 6510/15 stands out for the following characteristics:

- Independent tensioning system, which manages to increase the useful life of the threads, increasing profitability and which guarantees optimum surface finishes.
- New pulley design, with a pivoting extraction system that reduces maintenance times.

- Complete range of cutting thicknesses, thanks to its particular design of pulley packages and combination of grooves, without penalizing the useful life of the diamond wire.
- Excellent cutting precision and flatness, thanks to its particular linear skid guiding system and its rigid bearing structure.

- Easy and convenient access to the interior of the machine, thus facilitating the tasks of changing threads and their maintenance.
- Large diameter ball screw screws in vertical movement for smooth and precise travel.
- Servomotors synchronized by software in the vertical movements that ensure smooth cutting, low consumption, maximum precision and avoid backlash and problems of central motorization with transmission and transmission.
- Up to 15 wires with various possibilities for the combination of cutting thickness.

2 – STRONG POINTS:

The multiple diamond wire cutter is a multi-wire cutter designed to produce slabs, boards and slabs of variable thickness from large blocks of granite and natural stone. Traditionally in granite transformation factories, the sawing of the blocks is carried out to the size of the same with looms when the blocks are of large dimensions or with block cutters with large diamond discs in the quarry shops when semi-blocks are cut.

The multiple diamond wire cutter aims to be the alternative to the primary sawing methods currently used, improving the productive capacity quantitatively, efficiently taking advantage of the energy resources necessary for the production of materials and significantly reducing the waste produced during the cutting phase.

Comparatively, the advantages of the use of this new technology applied to the multi-wire cutter are evident. The multi-wire cutter can cut any type of stone material compared to looms that only cut granite or marble, but it is two different models that use different tools, the looms are only profitable when cutting sheets of 2-3 centimetres in width. thickness, but its greatest disadvantage is in energy consumption and the very high production of solid waste, since the water used is recovered in all cases, this waste, apart from supplying a higher cost of purification, presents a problem of environmental pollution in In the case of looms, since it contains iron, and lime that alters the acidity of the water, in addition to the moment it is not possible to separate or recover in this phase of the process. Compared to traditional block cutters there is an important difference that lies in the cutting height, with a disc we can cut 1.50 meters compared to the diamond wire that can cut any commercial block, apart from the great productive difference that exists.

The water treatment and purification process for this new process is therefore cheaper and less complex.

It is also worth noting that the water needs, although similar, with respect to the traditional loom, diamond wire cutting practically eliminates the need to wash the load after sawing, this being much less demanding and both the needs and the Water losses during the cutting process are lower.

Another aspect to highlight is that the multiwire cutter, for an equivalent capacity, the effective energy consumption is lower compared to any of the methods used. This translates into significant energy savings both in implementation and in production costs.

Regarding consumables, it must be said that in the multithread cutter there is only one: the diamond wire, which is small, easy of storing and supplying. The costs derived from storage, stock scheduling and handling, are also lower with respect to strap, shot and lime, necessary for the traditional loom.

Regarding the implementation costs, firstly, the simplicity and the consequent lower cost of the civil work stands out, while in the loom the necessary work constitutes an indispensable part of it, in the multi-wire cutter, this becomes a mere support of it. Furthermore, in the case of renovation or replacement of the machine, the loom forces the new implantation to be exactly the same model as the previous one, while in the case of the multi-wire cutter there is a high degree of possibilities of being able to carry out an adaptation of the existing civil works. In any important case, that is to say that the space occupied by the multithread cutter is less.

The simplicity of the multithread cutter is significantly greater, both in installation, use and handling, as well as in maintenance, both mechanically and electrically. It is important to note that the NDF-6510/15 multi-wire cutter does not use the common solution for vertical movement consisting of a central motor with reducer, transmissions and angle gearboxes. This is replaced by two separate and electronically synchronized servomotors without coupling between them. This solution, in effect, cancels out the drawbacks of classic mechanical transmissions, play and possible breakages due to wear and fatigue, and also allows us greater flexibility in the movements to be carried out. In this regard, it should be noted that the system is capable of working at speeds as slow as one millimetre per minute, as well as at speeds of almost one meter per minute, all without loss of power or precision in movement.

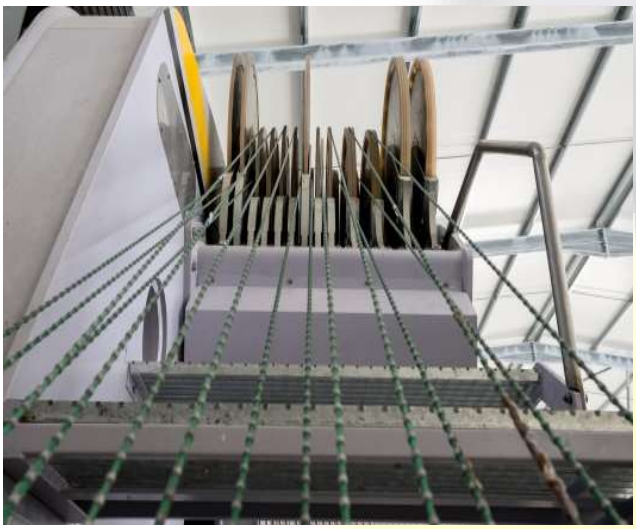
As a practical effect, the NDF-6510/15 cutter is the fastest machine on the market capable of making a vertical upward movement in the event of any contingency, avoiding undesirable marks of diamond wire on the stone.

The surface of the final product sawn with diamond wire, in addition to practically not requiring washing, much less the use of acids or harmful chemicals and dangerous handling, offers the important advantage that its surface state can be assimilated to a certain honed. In the event that the material has to be polished later, a

certain reduction in the costs associated with the abrasives used in the polishing process and the consequent reduction in production times should be noted.

The high speed of the multitwire cutter will also allow new users of this technology to schedule production with less advance notice and greater flexibility than the loom, allowing even partially cutting a block and reserving the rest of it for another more suitable time.

The flexibility of the production is also given by the clearly lower needs of personnel. Preparing the sawing on a wire saw for a cut consumes less than half the time and less than half the human resources of a traditional strapping loom.



With this cutting unit it is intended to integrate the fully automated operation of the primary sawing of stone blocks, with minimal human intervention and therefore a significant reduction in product handling manoeuvres, regularization and optimization of the work processes, the increase of the productive capacity thanks to the reduction of the cycle times and the efficient use of the downtime, the reduction of the energy consumption and the production of the waste during the cutting process, and finally the reduction of the associated risks for the personnel involved in the handling and machining of materials throughout each working day.

3- WHY BUY OUR CUTTER:

The use of diamond wire in primary sawing work has been used in the sector for a few years, and said wire is applied on known machines, normally made up of two pulleys on which a wire is installed forming a closed loop with which cuts are made on the stone blocks.

In recent years, machines that use several diamond wires have begun to be used, which are mounted on multi-channel drums or made up of several pulleys, on which several wires are mounted in order to perform several cuts at the same time on the stone blocks, thus obtaining significant productions.

The machines used up to now have different technical problems when it comes to correctly tensioning and controlling the wire loops, as well as another more significant one that lies in the possibility of varying in a simple way the position of the pairs of wires with the object of obtaining different thicknesses or varying them in the production of boards.

Taking these disadvantages into consideration, the N.6510 / 15 cutter stands out for its simplicity in the individual tensioning device of the tensioning hand wheels, and at the same time it has simplified their separation in order to allow the variation of processing thicknesses in the slabs and boards to cut simply and easily.

Nodosafer offers its customers, in addition to all the intrinsic characteristics of any thread machine, improvements as important as:

- **Architecture based on a robust and balanced structure to avoid vibrations.**
- **Maximum protection against the penetration of water and dust in the most sensitive parts.**
- **Large diameter ball screw screws in vertical movement for smooth and precise travel.**

- Linear guides for recirculation of rollers in the columns to guarantee the absolute verticality of the cut.
- Servomotors synchronized by software in the vertical movements that ensure smooth cutting, low consumption, maximum precision and avoid backlash and problems of central motorization with transmission and transmission.
- Basic large diameter drive drums mechanism that prolongs the life of the wire.
- Automatic tensioning device for independent pulleys of each of the wires, with control of position, arrow and tension of each of the wires.
- Automatic and progressive reduction of speed in case of excessive deflection in the line.
- Detection of wire break and controlled stop (fast braking and climbing at maximum speed)
- Controlled emergency stop to avoid marks on the cut block.
- Possibility of resuming a cut automatically or semi-automatically.
- Wide range of devices and program functions for operator and machine safety.
- Motorized trolley with optional position control.
- User-friendly colour operator panel with multiple configuration possibilities.

- Compact electrical panel with the latest technologies.
- High power main motor driven by inverter.
- Button panel for movements in manual mode.
- Automatic lubrication.

4- CONSTRUCTION DETAILS:

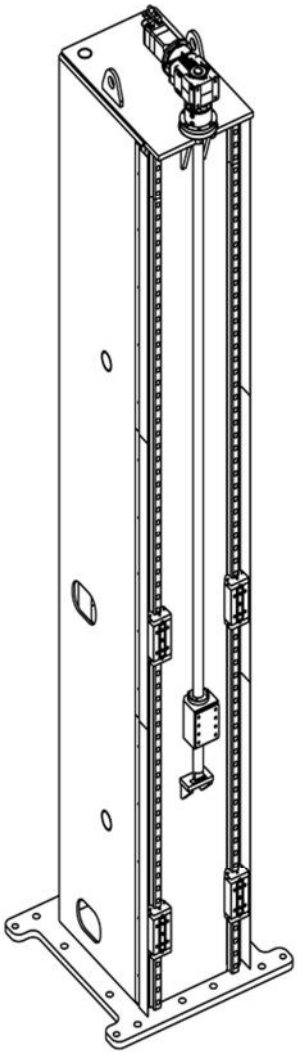


Fig. 1 – Column detail with linear guides, skids, vertical movement spindles and servomotors

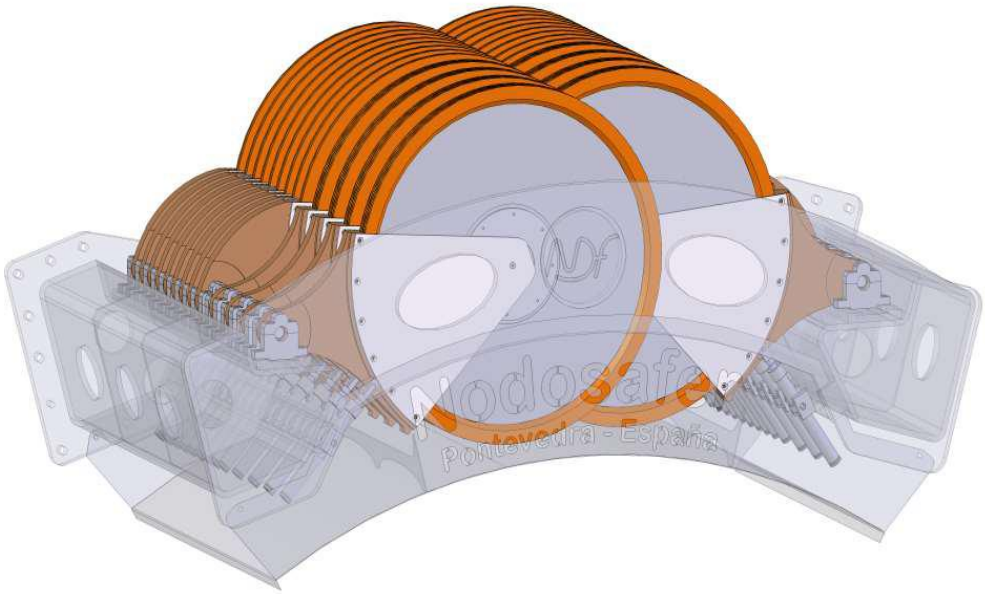


Fig.2 – Detail of the set of tensioning pulleys, articulated arms and independent tensioning cylinders

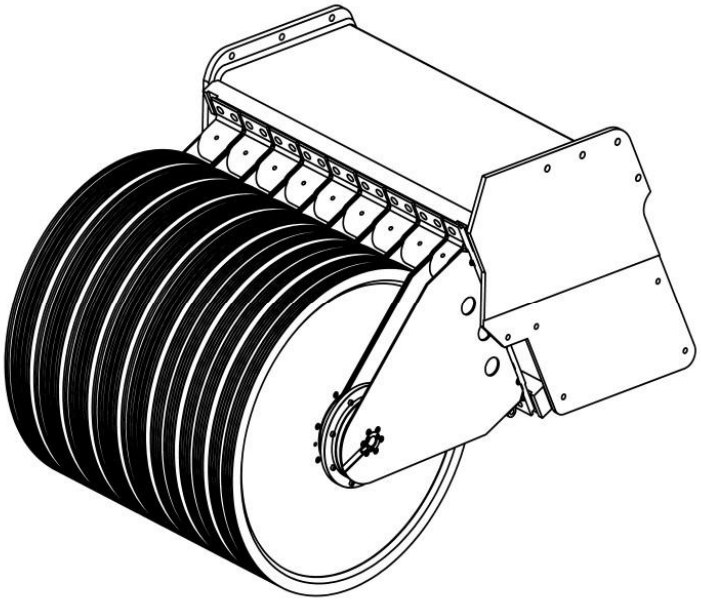


Fig.3 – Detail of removable idler pulleys with pivoting extraction system

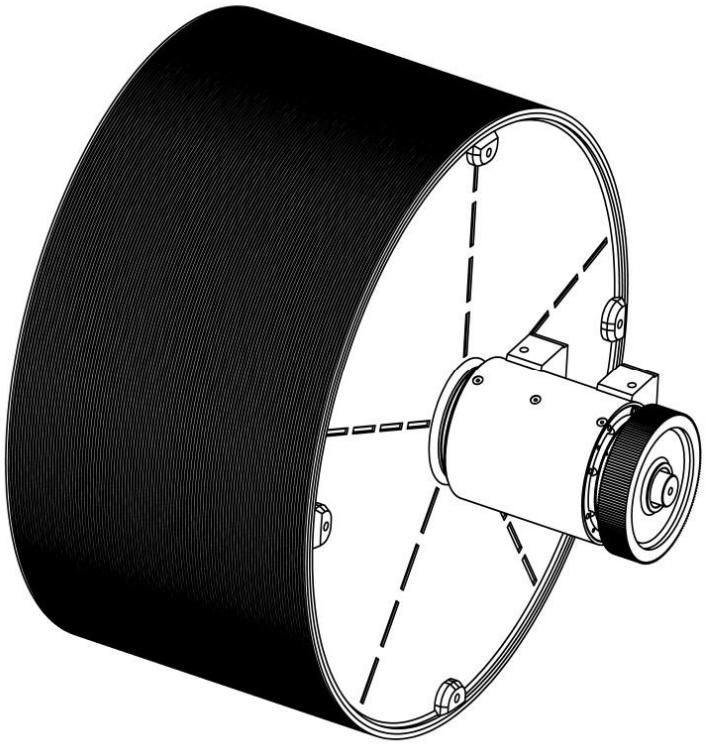


Fig. 4 - Detail of the drive drum, support and toothed pulley assembly

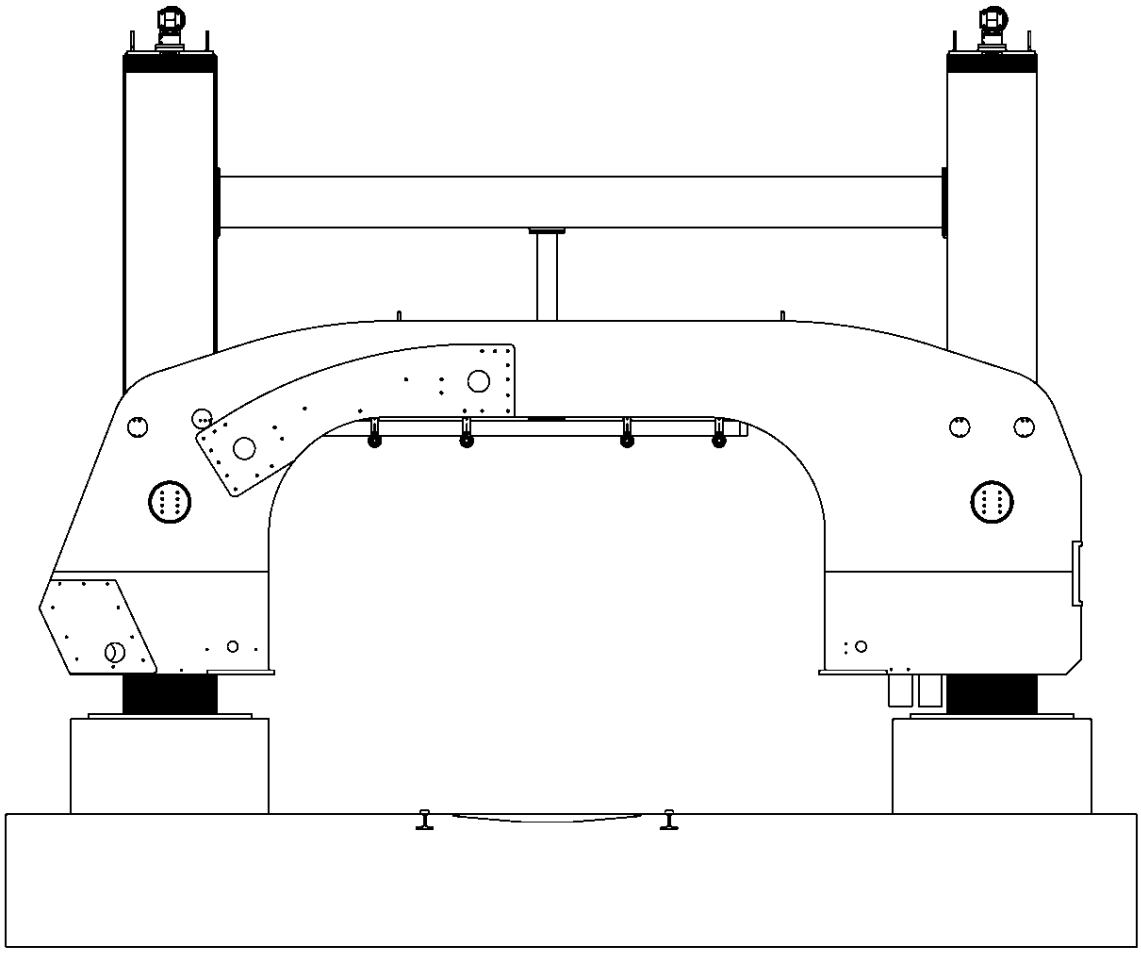


Fig. 5 - Detail of the main frame, columns and connecting cross member

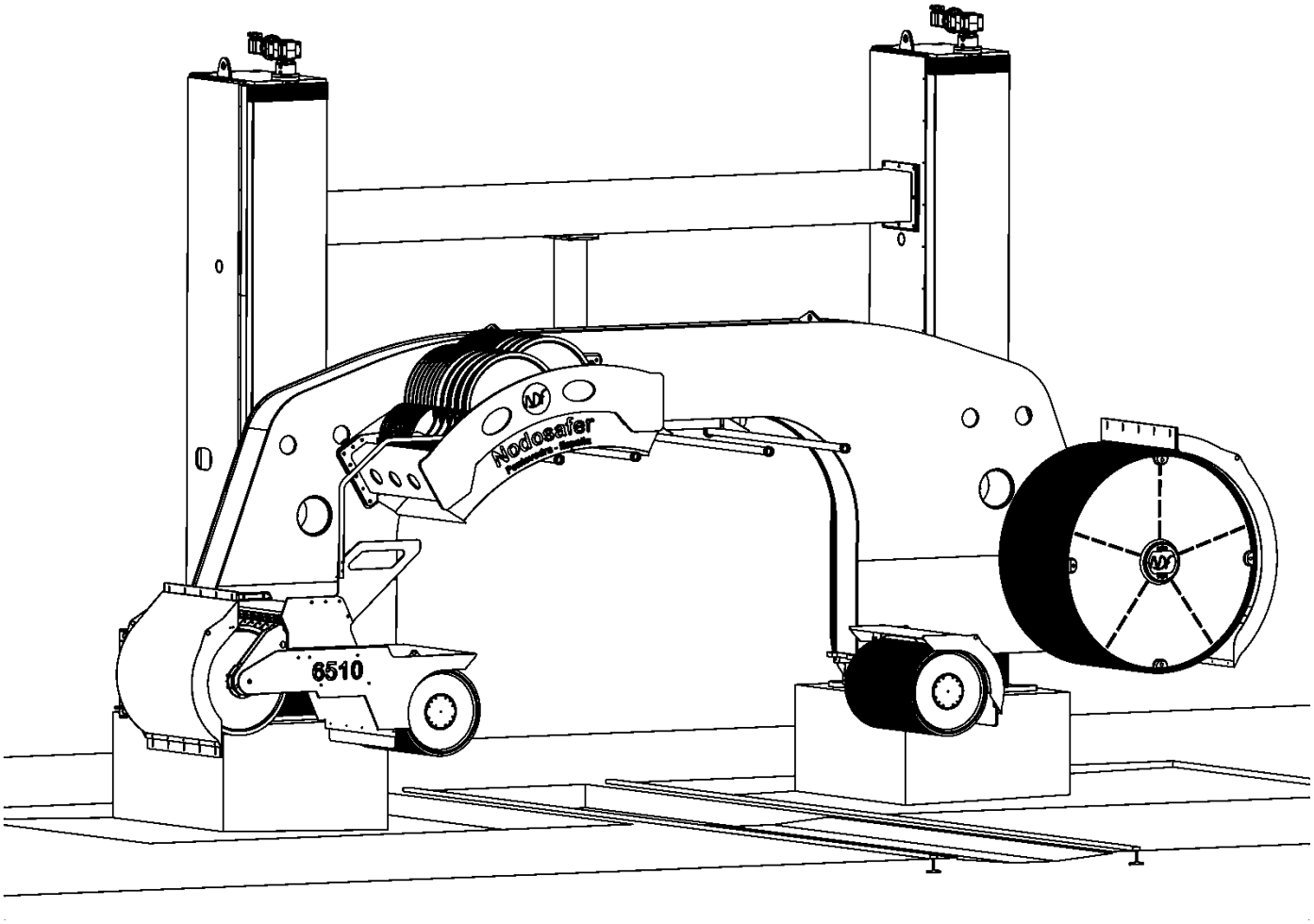


Fig. 6 – Machine overview

5- FEATURES:

MODEL	NDF.6510/15
Maximum number of threads	*15 uds.*
Machine height	*6,95mts.*
Machine length	*10,20 mts.*
Maximum block length	*3500 mm.*
Maximum block height	*2200 mm.*
Thread length	*22,40 mts.*
Wire diameter	*7,3 mm.*
Vertical travel of machine	*2300 mm.*
Drive wheel diameter	*1800 mm.*
Minimum cuttable thickness	*21 mm.*
Maximum separation between wires	*1000 mm (interiores)*
Diamond wire speed	*0 – 35 mts/sg.*
Main motor power	*75 Kw*
Total installed power	*80 kW*

6- SECURITY

NODOSAFER machines are protected and provide a security closure around their perimeter in accordance with CE safety standards.

7- LOAD BLOCK TROLLEYS