

The Scarfing Machine

MARIAUD CONSULTING



Our PROGRAM



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The scarfing machine

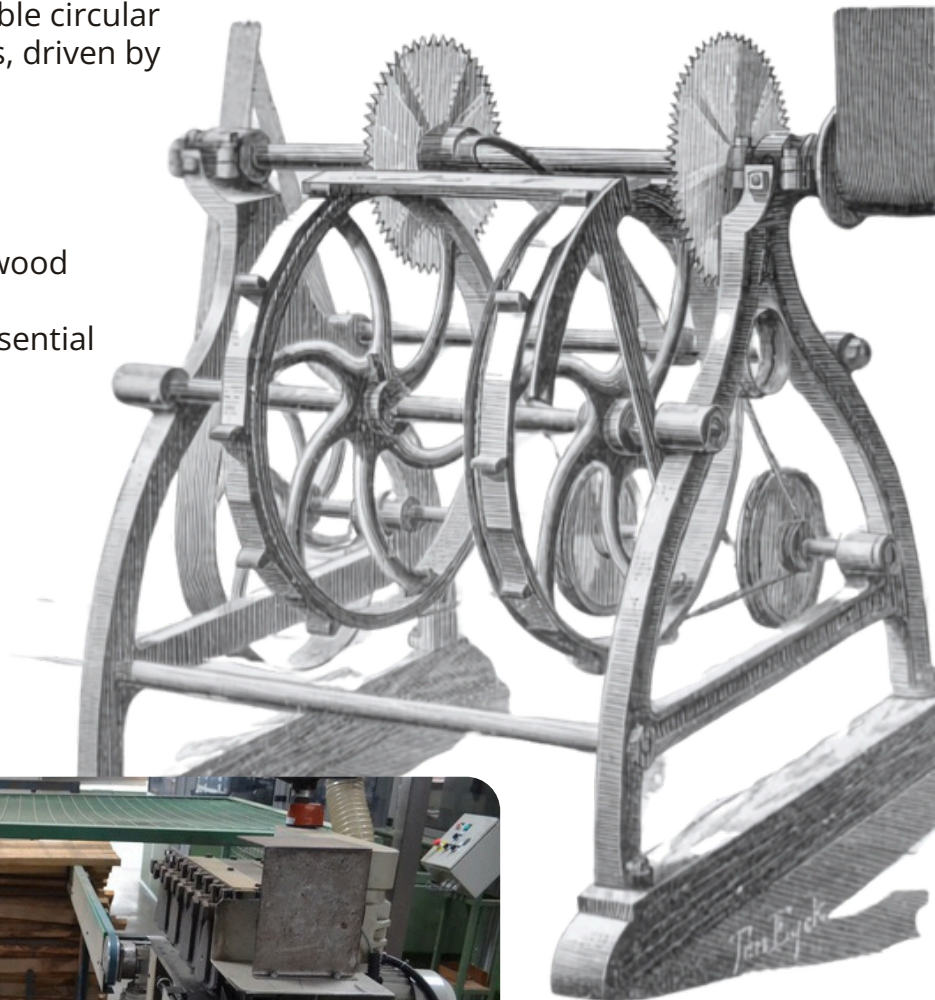
01 Presentation

L'écourteuse - The scarfing machine

The scarfing machine (L'écourteuse) is a simple machine used in cooperage to cut staves to a precise and repetitive length. It is generally located near a machining center or a stave joiner. It is composed of two adjustable circular saws between which the stave passes, driven by a carriage or a chain.

Its main role is to remove the waste wood (gerces) at the ends of the wood and guarantee a clean and regular cut, essential for the rest of the process.

A good setting and maintenance ensure the quality of the cut and the durability of the machine.



E&B Holmes

The scarfing machine

02 Terminology

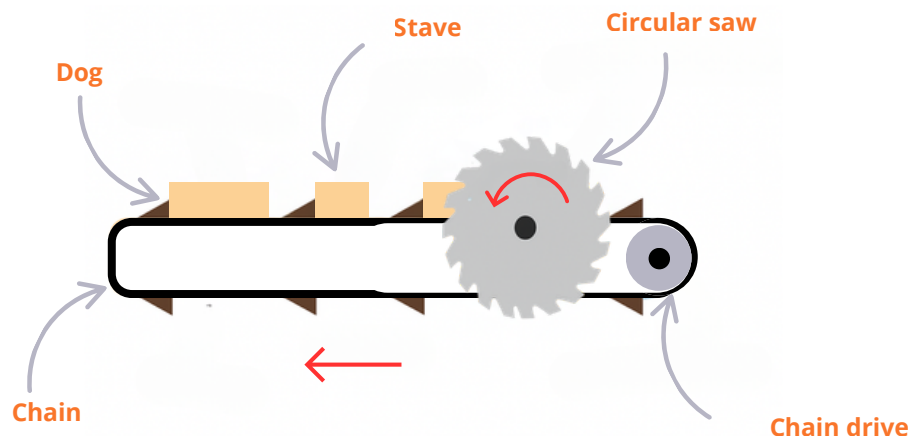
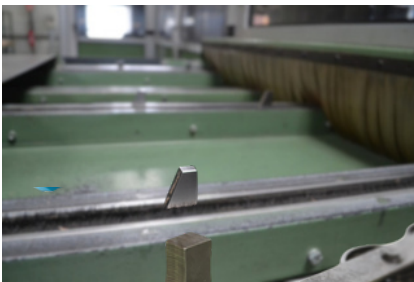
⚙️ Two Types of Scarfing Machines

There are two main systems for **advancing the staves in a scarfing machine**:

- **The carriage scarfing machine** (L'écourteuse à chariot)
- **The chain scarfing machine** (L'écourteuse à chaîne)

The operating principle remains the same in both cases — the stave passes between two blades to **be cut to length**.

In **chain models**, the drive is provided by a chain **equipped with dogs** positioned at regular intervals. These chains can operate in **continuous movement** or with a **return system**.

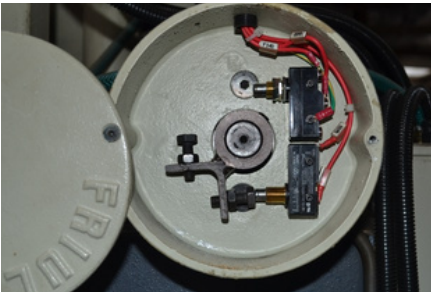


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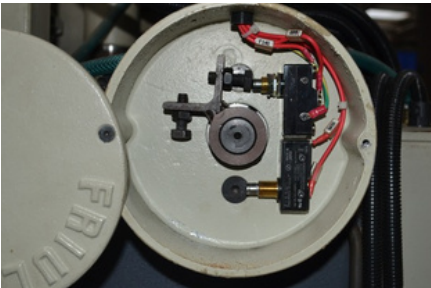
02 Terminology

The **return chain system** functions thanks to a **hydraulic mechanism**.

When the operator starts the machine by pressing the start buttons, the hydraulic pressure drives a shaft connected to the chain. This shaft turns **between two stops : one for the advance of the dogs, the other for their return**. This back-and-forth movement ensures the precise and regular displacement of the staves during the cut.



The **return stop** corresponds to **the starting point** of the chain movement. It defines the initial position of the dogs before each advance cycle.



The **end-of-travel stop** marks the maximum limit of chain displacement. It defines the stop position of the dogs once the stave has reached the end of the course.

Function:

This system is used to **detect the angular positions** of a rotating shaft (often a motor shaft or a hydraulic shaft). It is used to automatically trigger electrical or hydraulic actions, such as:

- Stopping at the end of travel,
- Inverting the movement,
- Or advancing to the next step of the machine cycle.

Visible Elements:

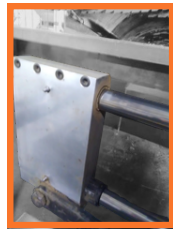
- **End-of-travel limit switches** (Les fins de course - microswitches in black), which are actuated by mechanical cams (here a piece mounted on the central axis).
- **Lugs with red wires** connecting the end-of-travel limit switches to the control circuit.
- **An adjustable cam** allows adjusting the point of electrical contact triggering.

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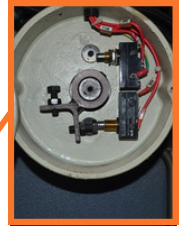
02 Terminology



Pusher System (Dogs)



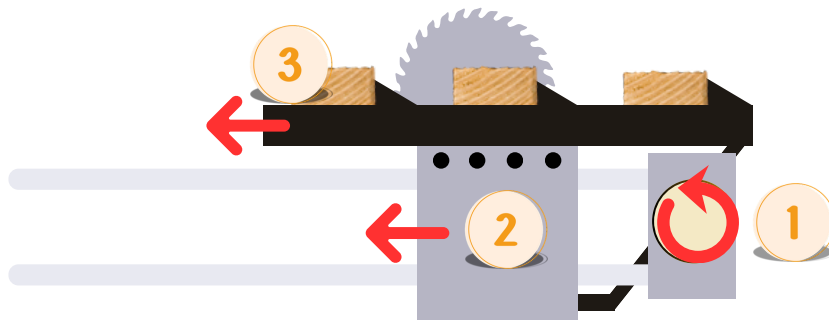
Guiding Carriage



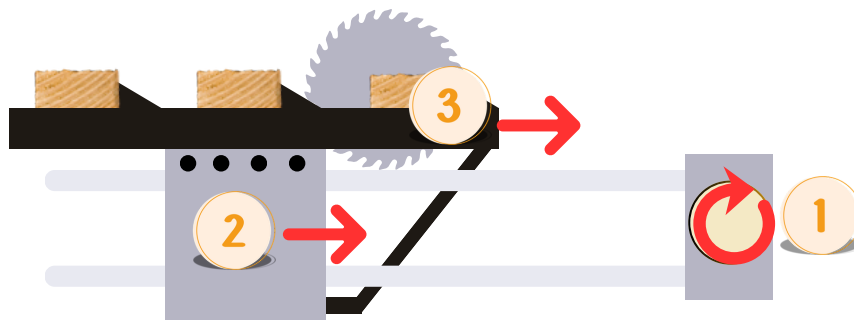
Rotating Shaft



A connecting rod fixed to the pusher system.



When the shaft turns inwards, it actuates the ball sleeves which move a block. This block is connected to a black connecting rod fixed to the pusher system. As it moves, the connecting rod pulls the assembly and pushes the dogs in the direction of the saw, thus driving the stave for cutting.

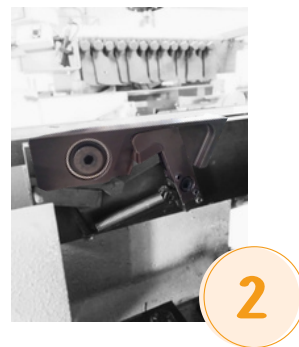


When the shaft turns in the opposite direction, towards the operator, the sleeves pull the grey block. This block pulls its turn the connecting rod, which brings the dogs back to the starting position. The system therefore operates in a back-and-forth movement, allowing a complete cycle of stave advance and return.

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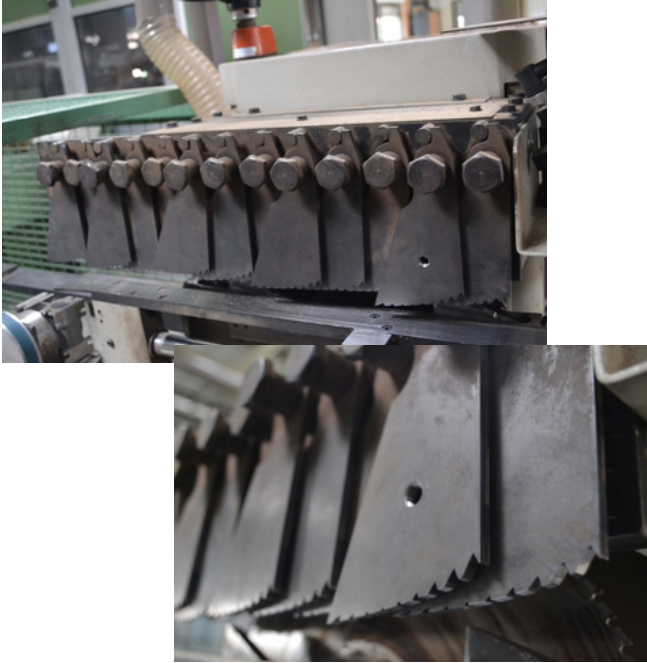
02 Terminology

All the dogs are **mounted on springs**. This system allows them to automatically lower after having guided a piece of wood towards the saw, and **thus pass under the next piece** without hindering its displacement. This ensures a smooth, continuous, and non-blocking cycle.



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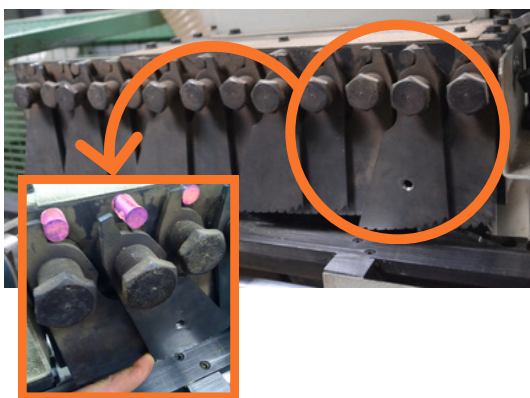


Anti-kickback claws are installed at the machine's entry. As soon as the stave is engaged, they automatically drive it towards the blade and then guide it to the exit.

These claws fulfill two essential functions:

- **Prevent the piece from kicking back**, to avoid any risk of accident.
- **Maintain the stave flat** against the table, like a presser, to ensure a stable and regular cut.

This system allows for rapid work, in complete safety, while ensuring good repeatability of the action.



When the piece of wood pushes against the anti-kickback block, **the latter tilts slightly and is no longer supported against its stop**. This movement allows the piece to advance while blocking any backward return, thus ensuring safety and stability of the work.

If the piece tries to kick back, the reverse movement generates a force that tilts the anti-kickback block against its stop. This contact immediately blocks the piece, preventing it from kicking back. This system therefore ensures **the operator's safety and the maintenance of the stave's position during the cut**.

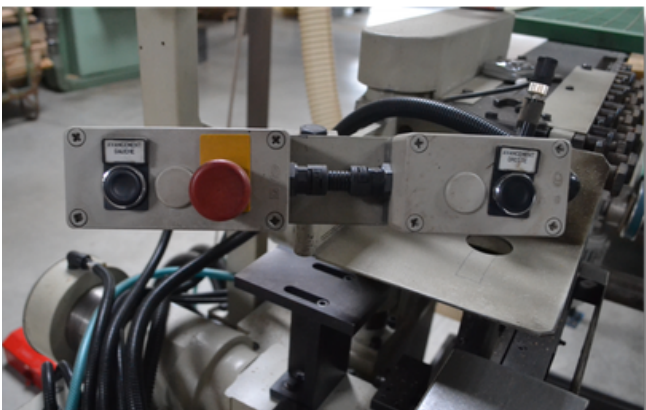
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02 Terminology



The scarfing machine is controlled by a central control unit. It includes the following elements:

- **Start / Stop Button:** allows starting or stopping the machine.
- **Piece Return Button:** launches the dog return cycle.
- **Scrap Evacuation Button:** activates the conveyor belt that carries the scraps to a skip.
- **Key Switch – Pusher Reset:** resets the position of the dogs.
- **Key Switch – Mode Selection:** allows choosing between manual or automatic mode.
- **An emergency stop button** is also present to guarantee the operator's safety.



The operator must **manually activate the dogs** each time a piece of wood is placed on the machine. This guarantees a **precise positioning and a controlled drive towards** the saw.

The scarfing machine

02 Terminology



Carriage scarfing machines function differently from automatic scarfing machines.

It is the operator who makes the piece of wood move back and forth between the two saw blades. The piece is not ejected automatically.

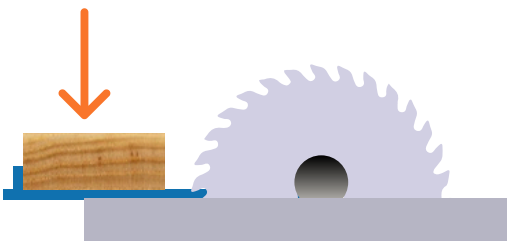
The operator must:

- **Manually remove** the stave after the cut.
- **Place it on a pallet, or**
- **Guide it towards another machine** (like the stave jointer).

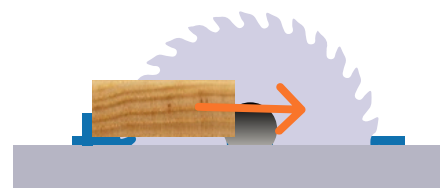


Some versions of these machines are equipped with hydraulic pressers, which hold the piece during the cut for more safety and precision.

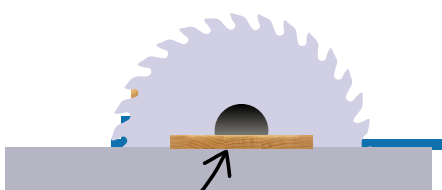
1 Stave loading onto the drive carriage.



2 Stave progression towards the cutting blade.

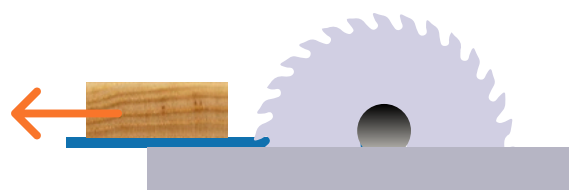


3 Wood scrap evacuation.



Ecourtture

4 Carriage return to the starting position.



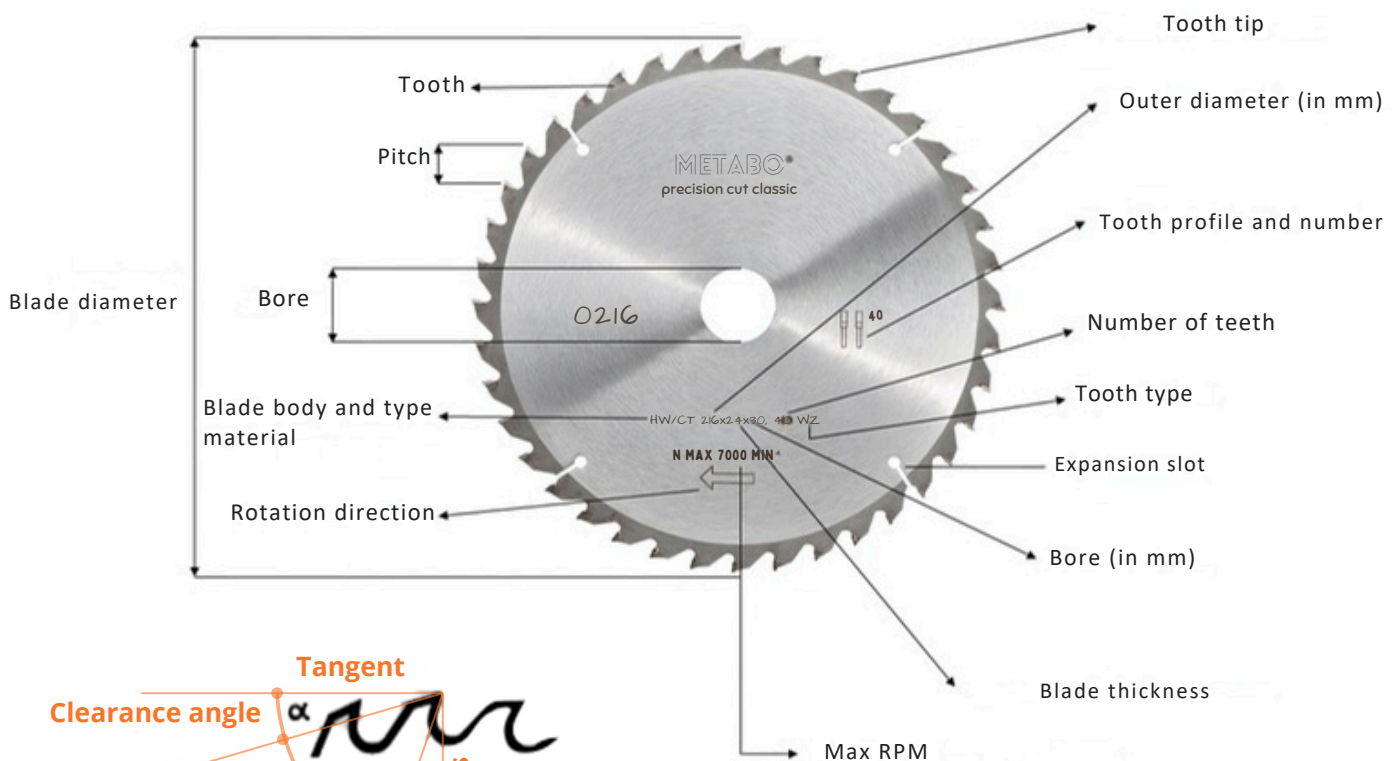
The scarfing machine

03 Types of Tools

General Composition of a Blade

A circular saw blade is composed of several key elements:

Element (Élément)	Function (Fonction)
Body (or Core) (Corps (ou âme))	Central part, in hardened steel. Ensures the rigidity of the blade.
Teeth (Dents)	Cutting parts. Their shape, angle, and spacing vary.
Carbide Inserts (Pastilles carbure)	Tungsten carbide plates soldered onto each tooth. Improve longevity.
Expansion Slots (Fentes de dilatation)	Cuts in the body to limit deformation due to heat.
Bore (Alésage)	Central hole used to fix the blade on the saw spindle.
Kerf (Trait de coupe)	Thickness of the blade. The finer it is, the less material is lost.



The scarfing machine

03 Types of Tools

🎯 Choosing the Circular Saw Blade

The choice of the circular saw blade depends on several important criteria:

- **The material to be cut:**

In 90% of cases, it is oak, hardwood that requires a suitable blade.

- **The thickness of the piece:**

Staves (merrains) are cut to a maximum of 30 mm thickness. The blade must therefore have sufficient cutting capacity without forcing.

- **The required precision:**

The average tolerance is ± 2 mm. A blade that is too worn or unsuitable would compromise the regularity of the lengths.

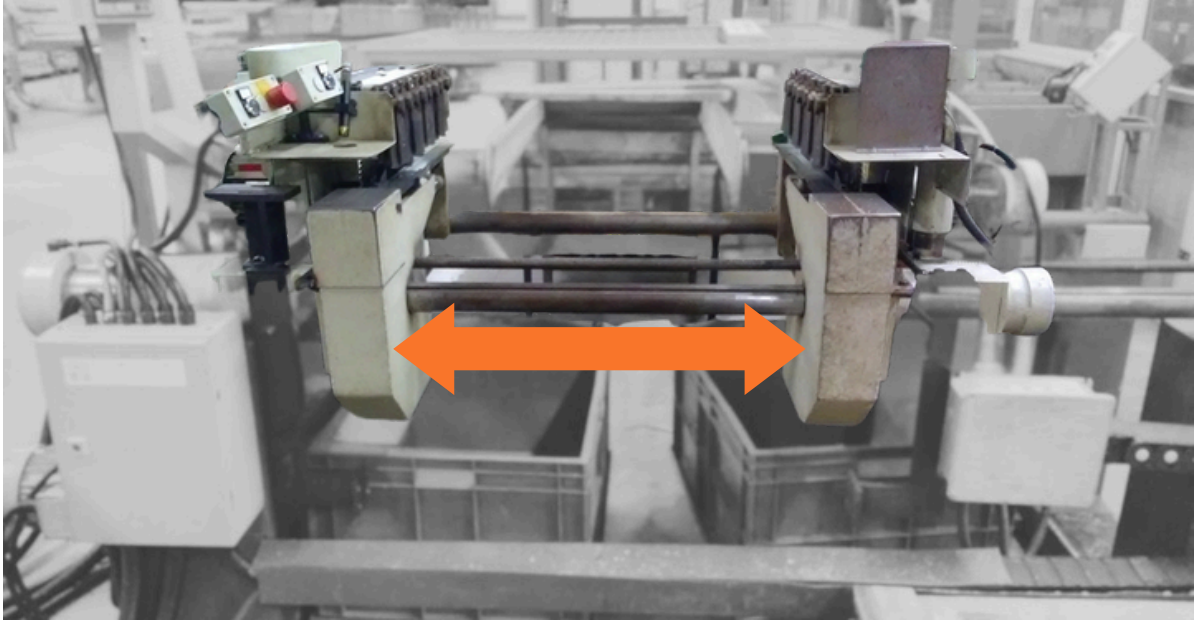
- **The machine power:**

The wider the blade or the more teeth it has, the more power it requires. The saw's motor power must match the blade specifications.

Characteristic (Caractéristique)	Recommendation (Recommandation)	Why? (Pourquoi ?)
Diameter (Diamètre)	300 to 350 mm	Good cutting capacity for 30 mm thickness.
Bore (Alésage)	According to your saw's spindle (often 30 mm)	To be checked on your machine.
Number of teeth (Nombre de dents)	24 to 36 teeth (Flat Top or Alternating Top Bevel)	Good compromise between speed and
Toothing (Denture)	FT (Flat Top) or ATB (Alternating)	FT = effective on hardwood / ATB = cleaner
Inserts (Pastilles)	Tungsten Carbide (Carbure de tungstène)	Necessary for oak, increases durability.
Kerf (Trait de coupe)	2.8 to 3.2 mm	Robust enough for wood without too much waste.
Rake Angle (Angle d'attaque)	Positive, between 10° and 15°	For a clean cut in solid wood.
Expansion slots (Fentes de dilatation)	Yes	Limits vibrations and heating.

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04 Settings



The **main setting** of a scarfing machine determines **the final length of the staves**. It must be quick and easy to adjust, as it is modified with **each change of barrel model** in production. A bad setting directly impacts the **conformity of the pieces**.



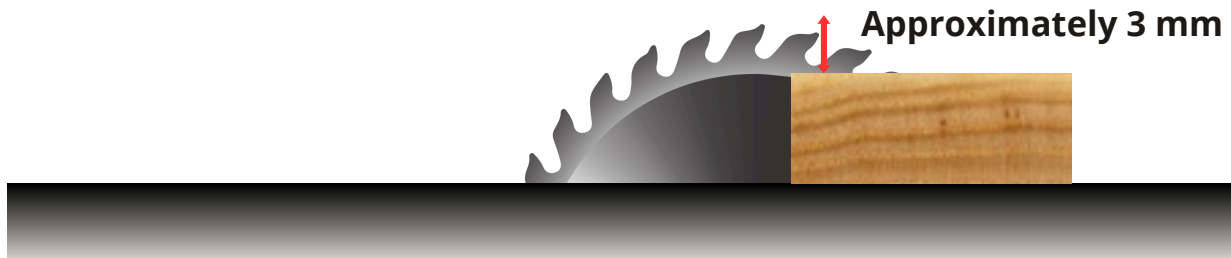
It is enough **to loosen the brake** which acts directly on the threaded rod, along which the right saw can move. This allows the spacing between the two blades to be **quickly adjusted**.



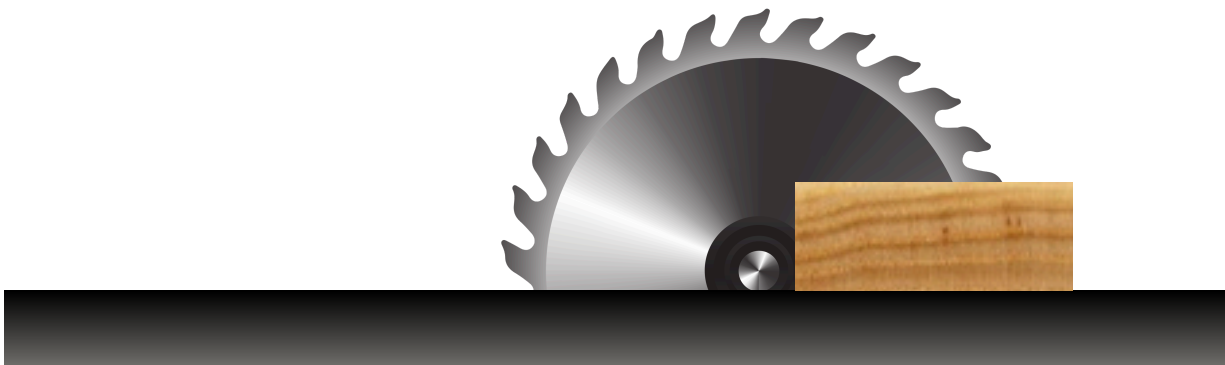
Then, simply **move the right saw using the crank**, until the desired dimension is reached, and then **re-lock the brake to block the position**.

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04 Settings



For safety reasons, the saw blade should only slightly exceed the piece of wood. An **overhang of 3 mm** is sufficient.



The **higher the circular saw blade is set, the more vertical the tooth attack angle becomes** in relation to the piece. This position promotes a **flattening effect of the piece on the table, thus reducing the risk of lifting.**

However, this setting has limits:

✓ Advantage:

- A perpendicular attack **improves the stability of the piece** and can **reduce the risks of kickback**, particularly on short or thin pieces.

⚠ Drawbacks:

- **The higher the blade is, the larger the contact surface with the wood, which increases the cutting effort.**
- This can **quickly wear out the blade** and **heat the wood**, especially if the piece is wide.
- A too-vertical angle can also generate **tearing at the exit of the cut**, because the teeth tear more than they slice.

The scarfing machine

04 Settings

Setting the Anti-kickback Devices



The **anti-kickback devices**, or safety claws, prevent the piece of wood from being projected towards the operator in case of jamming or a bad cut. Their effectiveness depends directly **on their height setting and therefore on the pressure they exert on the piece.**

☛ **On this machine**, the height of the anti-kickback devices is **mechanically linked to the setting of the blade height.** This means that:

- When the **blade is raised**, the anti-kickback devices also rise: their pressure on the piece **decreases.**
- When the **blade is lowered**, they press down more, ensuring better **retention of the piece.**



These gauges indicate the **pressure of the hydraulic circuit** responsible for driving the main shaft. They allow **for real-time control of the transmitted force**, ensuring stable and adapted rotation to the cutting efforts.

An abnormal pressure can signal:

- A **lack of power**,
- A **wear of the hydraulic components**,
- Or a **problem of overload on the shaft** (piece too hard, dull blade, etc.).

The scarfing machine

04 Settings

Setting the Dogs at the Exit of the Automatic Scarfing Machine



When **the exit of the chain scarfing machine is automated**, the stave can be directly transferred to a stave **jointer-evider** without manual intervention. In this case, **the spacing setting of the dogs becomes a strategic parameter** to adjust based on the pace of the next machine.

💡 Why is it important?

- **The longer the stave is, the longer it will remain in the stave jointer-evider.**
- **This means that the downstream machine processes fewer pieces per minute.**
- If the dogs remain too close together, there is a risk of **overload** at the entry of the jointer, or even a jam or poor alignment.

🔧 What to do:

- **Adapt the dog spacing according to the average length of the staves.**
- The longer the staves are, **the more the dogs are spaced out to reduce the arrival frequency of the pieces.**
- This setting allows for **synchronizing the flow between the two machines** and maintaining a **smooth, unjammed flow.**



The scarfing machine

05 Maintenance

✓ Routine Maintenance and Safety of the Scarfing Machine

1. Cleaning After Each Use

The operator must imperatively **dust off the machine** after each use to prevent the accumulation of sawdust.

*This limits the risks of fire, improves the visibility of mechanical elements, and extends the machine's lifespan. Furthermore, **the evacuation of wood scraps must be continuous** to ensure the fluidity of the workstation and prevent clogging.*

2. Checking the Suction System

Before any start-up, it is essential to **check the opening of the suction traps**.

Poorly adjusted suction reduces the effectiveness of dust capture, which impacts the operator's safety and hygiene.

3. Checking the Condition of the Blades

The wear of the two blades must **be checked regularly**, because:

- Dull blades increase mechanical effort.
- They reduce the quality of the cut.
- And increase the risk of wood tearing.

The operator can perform the blade change, provided they have been trained and authorized. If not, a qualified person must be called upon.

4. Lubrication of Mechanical Elements

Certain lubrication points (notably certain bearings or slides) must be taken care of by the operator.

The machine maintenance plan provided by the manufacturer must be respected for this.

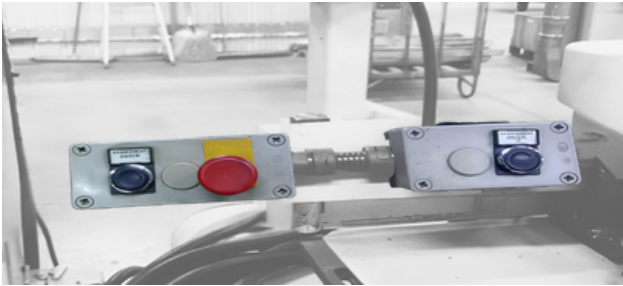
5. Management of Electrical Failures

In case of a **failure at the electrical control level**, the operator must immediately **stop the machine** and **notify their supervisor or a qualified technician**.

In no case should the operator intervene on the electrical circuits without specific training (risk of serious injury or worsening of the breakdown).

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06 Safety



To guarantee the operator's safety, **the machine requires the use of both hands to be activated.**

This system, called "**bimannual control**", prevents any accidental trigger.

- The operator cannot activate the machine while having a free hand.
- They are therefore physically kept away from the cutting zone, particularly the blade.

This device is a standard safety measure in machines at risk of direct contact with sharp elements or fast-moving parts.

The **bimannual control** is an **essential element for preventing serious accidents**. It must always be in good working order and must never be bypassed.

✓ Anti-kickback Devices (Les anti-retours)

The **anti-kickback devices** are an integral part of the **protective devices** on cutting machines.

Their main function is to **prevent the wood from coming back** backwards in case of rejection or a bad cut of the piece by the blade.

Why are they important?

When a blade grabs a piece of wood (mispositioned stave, knot, crack...), it can be violently pushed back towards the operator.

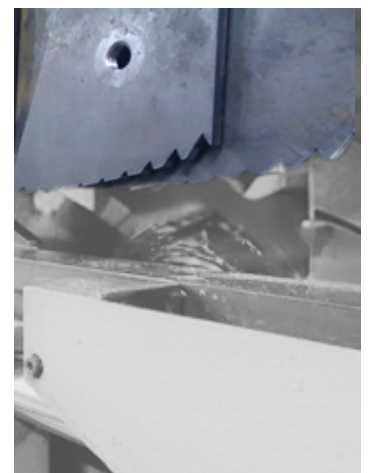
Anti-kickback devices, often consisting of **inclined serrated teeth** or **free-rotating rollers**, act like ratchets:

- They **allow the wood to pass in the direction of the advance**.
- And **they block it in case of sudden kickback**.

Direct Impact:

- **Reduction of serious accidents due** to projection.
- **Stabilization of the wood** during machining.
- **Complementary protection** to other elements like the blade guard or pushers.

💡 *Their effectiveness depends directly on their height setting: They must exert sufficient pressure to hold the wood, without slowing it down excessively.*



The scarfing machine

06 Safety



✓ Role of Protective Grids

Protective grids or wire mesh casings can be installed around the machines to protect the **operator from projections** of wood, dust, or metal fragments.

They play a dual role:

- **Physical barrier** against projectiles (in case of tool breakage or wood splintering).
- **Delimitation of the danger zone** to prevent unintentional access to moving parts.

Their presence is particularly important during the sawing of irregular or cracked pieces, susceptible to splintering under cutting effort.

These grids must comply with several criteria:

- **Height and mesh adapted** to the types of risks.
- **Preserved visibility** to allow the operator to monitor the process.
- **Solidly fixed** and **easily removable** in case of technical intervention (but locked in operation).

They are part of the mandatory collective protections (protections collectives obligatoires) recommended within the framework of industrial safety standards.

The scarfing machine

06 Safety

Suction on Circular Saw: A Device Adapted to the Direction of Chip Evacuation







Each circular saw is **equipped with a dedicated suction system**, designed to capture chips at the source.


This system is **oriented according to the natural direction of chip evacuation**, determined by:

- The **rotation direction of the blade**.
- The **inclination of the tothing**.
- And the **configuration of the protective guard**.

Why adapt the suction?

When chips are correctly directed towards the suction nozzle:

-  The work remains clean and visible for the operator.
-  The chips do not accumulate, limiting the risks of fire.
-  Cutting quality is maintained, without heating.
-  The guiding system remains clean, without obstruction.

 On certain machines, the suction system can **be adjustable or orientable** to adapt to different configurations (straight or oblique cuts, blade height, etc.).

The scarfing machine

06 Safety

🛡️ Personal Protective Equipment (PPE) to be Worn

The use of a circular saw requires **the systematic wearing** of several **PPE** to guarantee the operator's safety against mechanical, acoustic, and respiratory risks.

1. Eye Protection

- **Safety glasses** or **anti-projection visor**.
- Objective: To protect **against chips, splinters**, or potential **blade ruptures**.

2. Hearing Protection

- **Noise-canceling earmuffs** or **earplugs**.
- Objective: To limit exposure to **constant noise** (>85 dB), which causes fatigue and hearing loss.

3. Hand Protection

- **Suitable anti-cut gloves** (⚠️ Only outside the cutting phase).
- Gloves are forbidden **during manipulations close to the running blade** to avoid any risk of getting caught and pulled in.

4. Respiratory Protection

- **FFP2 mask** or **an effective suction system**.
- Objective: To prevent the **inhalation of fine dust**, which is harmful to the respiratory tract, especially when working with oak or treated wood.

5. Safety Footwear

- Anti-perforation soles and reinforced toecaps.
- To protect against **falling wood, blades, or tools**.

6. Fitted Workwear

- **Close-fitting clothing** to prevent any mechanical entanglement.
- No dangling laces, loose sleeves, or jewelry.

📌 Important Reminder:

*PPE does not replace collective protections (guards, suction, anti-kickback devices) but **complements the operator's safety**. Wearing PPE is **mandatory** and **non-negotiable** when the machine is running.*

*Apply this advice now and
take control of your machine
with confidence and mastery!*



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