



**PRUNING GUIDE
AND
FALCO 30 Pruner
instructions
Patent**

PRUNING GUIDE

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Enormous workload

Pruning is an old existing method, which when used with young trees, significantly improves the quality of the harvested logs during clear-felling.

Calculations indicate that there is approximately 9,000,000 hectares of forest in Finland that could be pruned. As approximately 450 – 500 trees are pruned per hectare, Finland has approximately 4,500 million trees to be pruned. Using current methods, this will take approximately 400 million labour hours, or a total of 225,000 labour years.

Why do trees need to be pruned?

Removing branches early enough that are no longer necessary to the lower sections of trees in round wood pine forests is an important forest care procedure. With correctly executed pruning, the amount of branchless and few-branched material is increased significantly.

It is also notable that active pruning, when compared to pruning completed by nature, produces more uniform and branchless schaalboards around the tree. This way, active pruning promotes and improves the production of high-quality wood.

Nature prunes slowly and randomly

Nature will prune the pine tree forests in the wilderness, but over a long time frame extending across decades. The result is that dry branches can randomly occur every few metres in sawn goods and uniform branchless trees are not obtained. This increases the handling and cutting of the wood. Following active pruning, the tree starts to evenly produce branchless material right after a few years of occlusion. After this, branchless tree is available for sawing and even random branches will not occur in the material.

Natural pruning cannot keep up with the current pace. Old untouched pine forests no longer exist outside wildlife protection areas.

Accelerated pruning

Mainly pines and European white birch trees are to be pruned in Finland, in order to obtain branchless sawn goods and birch veneer also in the future. Pruning should be accelerated by man.

When the aim is to obtain branchless, as good as possible timber for saws, pruning must be completed as much as possible. The forest to be pruned must be the type of growth that indicates it will grow into a high-quality logging forest. The pine trees that seem to grow the best are the ones that are growing sufficiently dense, planted by nature under the protective cover of a larger forest.

Pruning is used to improve the quality of already good forests. However, it can rarely be used to salvage too branchy forests that have grown too fast. Pruning can be used to promote and time the natural pruning of trees so that the branch-free base part of the round wood is in the same growth-phase throughout the entire tree and forest. This way, we can depend on the amount of high-quality wood to be grown decades from now.

There is plenty of knotty wood

During past years, predominantly spruce forest areas were renewed with pine trees. Spruce would have been the more natural tree for these. Now, those areas grow thick-branched trees, which will certainly not be pruned without active procedures performed by man.

Of course, they will produce branchy trees, but there will be a shortage of knot-free wood, as in the next few years, the supply of untouched wood material will diminish and saws will increasingly be supplied with quicker growth cycle wood material, as a result of actions taken by man. Currently, the growth cycle of a tree is to remain under 100 years.

Pruning pine trees with lots of branches that have grown in too scarce forests is not feasible, as they will likely only grow into paper trees, which do not have to be pruned during growth.

Pruning for the right trunks

Only relatively thin pine trunks should be pruned. Their diameter should be 70 – 140 mm. (7 – 15 cm). This being the case, trees are still able to produce plenty of branchless wood material during their approximately their 40 – 60 growth years of growth. Pruning tree trunks thicker than that is not estimated to lead to a similar gain.

It is important to bear in mind that clear-felling mature trees is the objective, which means that the thicker trunks will also be harvested at the same time with the other trees. In principle, this means that it has also grown for the same number of years generating knot-free additional wood.

Are fresh branches pruned?

Some specialists estimate that a pine tree only has eight active branch layers. Branches below that are already in regression. Some specialists say not to prune fresh branches. They believe this slows down growth. This most likely holds true for the diameter growth of the tree.

In contrast, others say that when photosynthesis is prevented on the lower branches of the trees, the tree will direct more of its growth upward toward the treetop, which increases length. Regardless, the tree will regain its normal growth rate within a few years and it will grow

branchless wood at its base. Naturally, occlusion would be quicker in a pruned forest where the diameter growth would be as plentiful as possible. Naturally, marked trees can be pruned even during several phases.

Length or diameter?

When pruning the lower branches in growth regression, the length growth of the tree can be increased. In a few years, the tree's photosynthesis ability will have returned to its normal level. This increases the tree height, but the diameter of the base will remain smaller. Naturally, the goal is to obtain as sturdy of a branchless base-log as possible. However, the tree volume growth is assumed to remain the same for the forest owner. The conclusion can be made from this that some of the trees (good trunks that have only dry branches) should be pruned hoping for base-logs. Fresh lower branches should be pruned also on other trunks hoping for length growth. In any instance, a pruned forest looks well-cared and the undergrowth is able to grow. This increases nutrients as humic substance for the roots of the trees.

What types of branches are pruned?

With production pruning, over 15 mm branches in diameter are not recommended to be pruned. However, at times even the slightly thicker branch is cut, so that the forest appears more uniform. This is why pruners should be able to prune even thicker, 20 – 25 mm branches.

However, it is important to remember that the thicker the branch, the slower the occlusion (the healing growth of the cut). Occlusion occurs so that lip-like walls begin to form from the branch base, which grow around the wound. When the walls meet, regular tree growth is resumed.

From fibre material to high-quality lumber logs

Already now, sawmills have requirements regarding the largest allowed branch size and their frequency. In the event that the sturdy wood material is used as fibre logs due to having a great number of branches, it is profitable to prune all types of living branches in pine forests of a particular size. This prevents the formation of large-diameter branches and the expected value of the tree is promoted from logs used for fibre to logs used for lumber. This is the case, even if the tree wouldn't be a top-quality base log. It prevents it from being disqualified due to it yielding a great number of knots.

When is pruning done?

Pruning is recommended for pine trees and European white birch trees. With spruce trees, conventional wisdom states to rather cut a spruce tree at the base than one of its branches. However, dry branches can be cut on spruce trees as well, although they rarely occur.

With pine trees, pruning is recommended for trees 70 – 150 mm in diameter that are expected to grow into lumber logs. Both dry and fresh branches can be pruned. However, it is important to leave approximately a third of the living top growth. At least the eight branch layers. A pine tree can be pruned up to 4 – 6 metres in height. The base log should be branchless.

Only dry branches are pruned from European white birch trees. Birch trees do not generate antibodies to protect the wound. Therefore, the pruning should be done when the birch has leaves. This allows one to tell if the branch has dried. When pruning fresh birch branches, the branch location tends to form a rot defect. This is particularly harmful with birch veneer.

The first half of the growth season, from spring to the end of August, is active pruning time with pine trees. During this time, the wound will become covered in sap during the following days. Pruning is not recommended during the fall, due to potential fungus infecting the wound.

Government aid is available for pruning

When one believes to own a total of one hectare of forest suitable for pruning, even in different areas, it is a good idea to contact the forest management association or forest service entrepreneur and agree on inspecting the area for eligibility for KEMERA funding (sustainable forest funding). The tree quality and suitability for pruning is inspected and inexperienced pruners are advised on how to complete the task.

Forest owners often feel that even good forests cannot compete for the limited amount of annual funding allocated for the area. Instead, pruning has to be done at the owner's expense without financial aid.

Several landowners prune their forests merely due to the enjoyment of the task or for landscaping purposes. This is the case particularly in or near the yard area.

What kind of tools for pruning?

Pruning does not currently occur nearly enough. The greatest reason for this is the lack of appropriate tools. The used bow saws and other tools are so heavy, slow, and difficult to use that the price of pruning becomes unreasonable in proportion to the price of timber. In addition, devices that climb tree-trunks cause abrasive damages to the surface of the trees. This results in harmful damage, such as sap pockets, in the timber.

Over the years, several tools have been developed for pruning. The most familiar one of them is the branch saw. There are several different manufacturers of them as well. The saw can be used to prune up to 6 metres in height. This allows it to reach the goals set for pruning.

Pruning can also be done using a long piece of wood. This is a quick method and is suitable for branches that could be broken off even using fingers. Striking branches thicker than this may cause the internal surface to be broken loose.

A machete can be used for lower branches.



Image 1. Branch saw and extension handle by Wolf Garden.
The Falco pruner can be attached to this same handle.



Image 2. A pruner by Sandvik with pulleys operated by ropes.

There are also tools on the market that have two blades that rotate against each other. The difficulty with these procedures is that the worker performing the pruning must transport batteries or a petrol motor with them as an energy source.

The illustrations feature different types of tools.

(57) Fiivistelmä - Sammandrag

Keksintö tarkoittaa yksinkertaista, halpaa laitetta, jolla kasvavien puiden pystykarsintaa voidaan kohtuullisesti suorittaa kohtuullisin kustannuksin. Laitte on niin kevyt, että sitä voi helposti kantaa metsässä mukana. Laitte on toiminnoiltaan sellainen, että se toimii lumessa ja pakkasessa. Laitte koostuu jousitetusta terästä (2 ja 2a). Vetävistä pyöristä (3 ja 3a). Laitteen moottorista (5) voima välitetään vaijereiden (4) avulla vetäville pyörille (3) ja hampaapyörän avulla pyörälle (3a). Käynnissä oleva laite asetetaan puun ympärille avaamalla terän takaosa (2a) ja levittämällä joisitettua terää vetävien pyörien varaan. Sen jälkeen terän takaosa lasketaan alas ja laite ajetaan kauko-ohjaimella (6) ylös puuhun. Laitte karsii ylösmennessään puun alaokset lyömällä. Kun laite on noussut riittävän ylös, se palautetaan kauko-ohjaimella (6) käskyttämällä tekeisiin. Sen jälkeen laite siirretään seuraavan puun ympärille ja karsintatyö jatkuu.

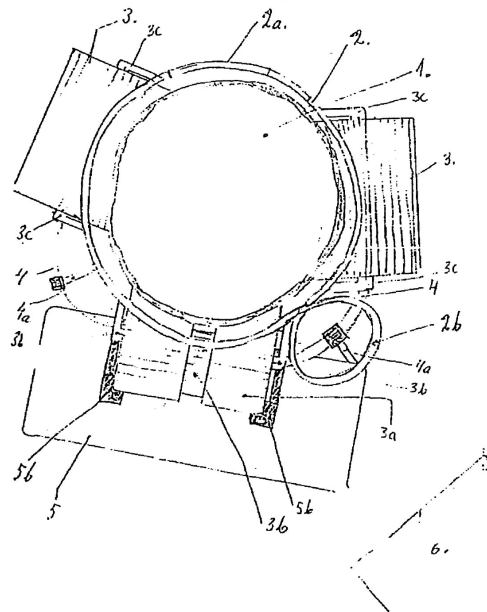


Image 3. A climbing unit from a patent application (933752).

Impossible tools for pruning

Over the years, different types of patents have been sought for different pruners and pruning procedures. Several publications have stated that even striking dry branches using a long stick can harm the tree. The surface of the tree may be struck loose from the tree material, which creates a sap pocket. The user cannot see it, as the wound or tear is not created on the surface.

Equipment that climb up the tree on their own, must in every instance use the trunk of the tree for support. This may cause the bark to be lost due to the tight pull grip. In addition, a problem with this type of equipment is that the cut or sawing of the branch starts from underneath the branch. Once the branch bends downward, the cutting device may become trapped. In effect, the tree pinches the saw. In addition, the different types of branch stubs cause a rough surface for the device, both when going up and coming down. This makes it difficult for the device to move evenly without damaging the surface of the tree.

Pruning is a task that is done one branch at a time

As discussed before, even then the tree cannot be pruned using more efficient climbing methods. Therefore, pruning is a task done one branch at a time if a cutting procedure is used. Does it make sense to prune branch by branch, when a harvester operator can prune the branches much more efficiently, while seated in the comfortable driver's seat and listening to music. Why should a forest owner prune for a sales event that may occur years in the future?

Knot-free lumber is running out in Finland and higher prices for branchless base logs are expected in the future. Pruning is an enjoyable exercise. Shoulder muscles receive a good workout while pruning.

Do not damage the bark of the tree!

Do not unnecessarily damage the bark of the tree at any phase under any circumstances or using any tool. The wound will likely form a sap pocket, which is much more harmful than the damage caused by an unpruned branch. Pruning branches cannot result in sap pockets. This would negate the effect of the valuable work performed.

Thoughts: A tree is cone-shaped

Branches are acceptable in lumber cut from heart wood. Branches are not desired in the thinner lumber cut from the surface wood. Branches under 100 mm in diameter, will certainly remain within a 100 x 100 cut. When including the bark, stems of 12 – 15 centimetres in diameter can be pruned at chest-height.

Occlusion may take approximately 5 years. Where is growth directed with lumber trees at that time? The sturdy heart wood or the surface wood. In any instance, the tree will still have room for improvement.

Due to the cone-like shape of the tree, branches higher up are closer to the heart wood and will, therefore, be more likely to remain in the lumber. Can this be affected by using thicker branches or maybe a longer stub? After all, as a tree grows, the strengthened roots have produced thicker branches higher up, maybe starting right at the halfway point and upward of the base log.



FALCO PRUNER UNIT INSTRUCTIONS

FALCO pruner unit operation

The invented device is best suited for pruning trees approximately 10–15 cm in diameter in the growth phase that have grown in rather dense pine log forests. The device is also suitable for removing thick, growing branches, as done in parks and near power lines.

A characteristic of the device is the rotating cutting action around the branch. The smooth side of the device is always placed against the trunk.

Only one light and approximately 11 cm light tug is sufficient per branch. The device does not have a pulley, so both hands are working in the same direction the entire time. If necessary, body weight can be used to help.

The final wood material that carries the branch will remain in the centre of the branch, avoid tearing from occurring. A potential breakpoint would be far from the bark of the stem wood.

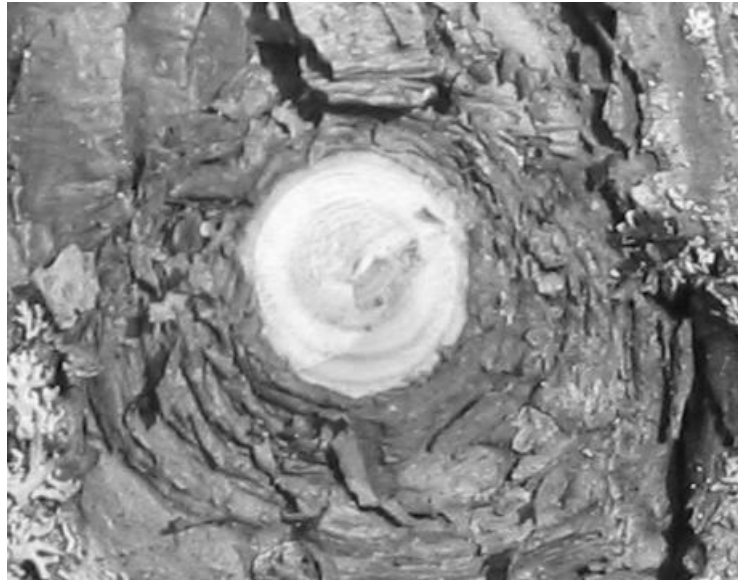


Image 4. With Falco Karsija, the cut finish is neat as if carved.

The device is easy to use. When placing the device to the stem of the branch, a simple guide directs the cutting jaws onto the branch.

How should the Falco pruner be used?

My work practice with pruning a tree is starting initially with the lower branches with a stick starting from the root upward. If the branches do not break with this light swipe, then they are pruned using the device.

Usually, I circle the tree clockwise and bring the cutting jaws of the device to the base of the branch from underneath. I then pull on the handle of the device, which cuts the branch. Using this method, the entire tree can be pruned. All branch split offs are cut using this method. Sometimes, another branch in close proximity may hinder operation of the device. In this instance, the obstructing branch is addressed first. Ensure that the branch is entirely in the cutting jaws and not, for example, between the points that prevent the blades from crossing. This may happen particularly with larger branches and it can cause an unnecessary jerk.

Another method is to simply prune an opening using the aforementioned procedure placing the cutting jaws to the base of the branch and begin pruning branches from top to bottom. The tree is circled counterclockwise in this procedure. After a branch, the device falls to the next branch by itself and only a new pull is needed for each cut. This avoids the user from having to carry the weight of the device. However, verify that the device is situated at the base of every branch in order to ensure the best pruning result. Position the device against the tree-trunk even to the extent that the flexible frame of the device is slightly bent.

Exercise care with the length of the stub remaining on the tree!

Ensure that the smooth side of the device is against the tree. You can learn a procedure, where in the beginning of the pull you slightly press the device against the tree so that the spring of the frame plate is slightly bent. This ensures short branch stubs.

With KEMERA funding, the allowed length is only 5 mm. As the device has the natural tendency to leave a stub, even simply due to the thickness of the blades, one's personal work method must be practiced and the results observed. The device can be used to cut branches without worrying about the stub and for pruning and caring for the length of the stub.

When the branch is in a slight angle when compared to the tree-trunk, as usually is the case, the device's hook blade is well positioned at the branch base and the cut is to take place right next to the base. The problem is the strong dry branches that protrude from the trunk that no longer have a visible branch collar. It is particularly important to ensure that the device is pressed against the trunk of the tree in this instance. When working carefully, a shorter than 5 mm stub is created even in such a case.

It is good to work for a while and become accustomed to controlling the quality of one's work. Often, a branch that has been cut too long can be shortened further by repeating the motion.

Use protective gear!

When pruning, logger protective gear must be used. Most importantly a helmet and protective eyewear should be worn. Even though eyes are not exposed to sawdust when using the Falco pruner, bark, branches, and other material may be ejected from the tree, which could result in an eye-hazard. A branch falling from a high elevation has a lot of kinetic energy, which can result in injury when striking the head or face.

Avoid crossing the blades!

Two sharpened blades that operate against each other can have a tendency to cross over each other under great strain. This happens even with the Falco Karsija, if thick branches are being pruned. In order to avoid the blades from crossing, the tips of the blades have been designed to prevent crossing and the blades have only been minimally sharpened on the cutting jaw side of the blade. Monitor the operation of the blades and learn how to feel when the amount of resistance is so great that the blades are in danger of crossing. Blades that cross and have been pulled with force may bend, in addition to creating a groove

on the blade. When pruning large branches, you can use several pulls by returning the unit to its normal operating condition between pulls.

Damages caused by crossing the blades have been removed from the 3-month warranty, as over the years, only a few pruners have been subject to the damage and a satisfactory reason has not been provided.

However, it is assumed that activities differing from regular pruning, maybe other types of trials, are the actual reason.

Pruner design and servicing

Precautions

The pruner is well-known for having two blades that create a cutting action around the branch simultaneously with the jaws closing. This places the break-point at the centre of the branch. This prevents tears with fresh branches in particular.

The device can be used to prune branches up to 30 – 35 mm diameter. However, these should rather be fresh than dry. However, the recommended diameter for the device is up to 20 mm.

The device itself actively prevents hazards, but still exercise caution with your fingers when trying the device and learning about its functionality.

DO NOT LEAVE YOUR FINGERS IN THE CUTTING JAW.

Do not leave your fingers between the counter blade and the guide or the frame. The edges of the components cut from sheet metal may be sharp.

WARNING!

When the functionality of the device is tested by hand and the hood blade is pulled around its joint, the cutting jaws close. **WATCH OUT FOR YOUR FINGERS!** In this instance, grip the sides of the blade or preferably the spring bushing. Do not grip sharpened cutting parts.

IT IS RECOMMENDED TO TEST THE DEVICE BY PLACING IT AROUND A BRANCH .

Only use the device for pruning and potentially for clearing saplings. Do not use it to cut metal or plastic objects.

Use the following instructions when servicing the device.

Disassembling the device

When disassembling the device, the coil spring may spring loose and be directed toward you creating a hazard.

When disassembling the device, first remove the chain (7) from the counter blade (6). This prevents the cutting jaws from closing when moving the blades. Following this, you can remove the blades and the spring from one another or remove the hook blade from the frame plate by loosening the screws (18).

Tightness of screws

Visually inspect the tightness of device's screws and the operating clearance of the blades at least once an hour. Later, inspect as you see fit based on your experience. When working, the device could become disassembled when in an elevated position, which could create a hazard from the falling parts.

The operating clearance has been set to 0.1 mm using a bushing. The operating clearance is automatically corrected by replacing the bushing and securing the screws as tight as possible.

Tightening the spring bushing

When you feel that the device is beginning to perform poorly, a branch remains in-between, it cuts poorly, or it leaves marks in the bark, the most probable reason is a loosened spring bushing or bent blades.

Take special care to ensure that the spring joint screw is properly fastened. The screw must be tightened using a wrench (17 mm) and an appropriate hex key as tight as possible. In no circumstances is tightening by hand in the forest enough.

When tightening the spring bushing, the tightening nut (wrench size 13) is loosened and a 17 mm wrench is used to prevent rotation. After this, the 17 mm wrench is used to tighten the spring bushing so that it is not loose, but the spring can still open the cutting jaw with ease. Then the spring bushing is retightened/secured using the nut. Note that the axle of the blades cannot be removed. The axle has been locked to the counter blade using a hard locking fluid. Also note that any excess clearance between the blades is not good, as it may cause the blades to cross.

Servicing the blades

Do not heat the unit's part above 250 °C. Otherwise, the tempering and spring characteristics may be compromised.

Components can be bent back into the correct position, if they have lost their original shape due to great stress. Straight and correctly shaped components are available from the supplier by order. Upon delivery, blade 5 intentionally has a small bend above the chain. This is used to ensure that the device can be positioned in close proximity to the trunk and the base of the branch.

You can sharpen the blades gently using a file, lamellar disc or sharpening stone. When sharpening, prevent the blades from turning blue. This is an indication of the temperature getting too high.

If the jaw formed by the blades does not close after sharpening, you can increase the top section clearance by filing a bit off the back of the space plate (part 16). Two to three strokes with a file should be sufficient.

Lubrication

For normal functionality of the device, it is important to lubricate the two bushings with grease. The lubrication will be effective for a while, but then will require reapplication.

The lubrication interval is approximately 100 trunks, approximately 2,000 – 3,000 branches. The frame plate of the device has a hole intended for lubricating the upper joint and the counter blade has a hole intended for lubricating the blade joint. The holes are located on the smooth side of the device that is to be held against the tree. Place grease into them using a lubricating tool intended for lubricating the head wheel on a chain saw flange.



Image 5. The two lubrication holes in Falco Karsija.

Remember to also lubricate the chain and, first and foremost, the chain's attachment joint to the frame. A thin oil is used for this.

The use of grease at the joints during freezing temperatures appears to be a problem. The spring of the device does not have enough strength to return the device to its starting position. Slightly heating the device or cleaning and lubricating it using thinner oil is helpful.

Applicable handles

The delivery includes adaptors for the World Garden's multi-star handles. We recommend ZM14, ZM15 and ZM17 or ZM-V3 and ZM-V4 handles. The adaptor for the Bahco AP-5M handle is available upon special order. There is no available information on the expected life of the handles during heavy pruning.

You can also use a wood handle. If doing so, remove the Wolf handle adaptors, secure two screws through the frame and use a tightening clamp to prevent the handle's end from splitting. Install the wooden handle on the coil spring side so that it does not prevent placing the device close to the tree.

Removing from use

A device being removed from use can be disposed of along with metal scrap. The packaging used for shipping can be burned or placed in general waste.

Warranty:

The device is issued a three-month warranty against manufacturer defects from the presumed delivery date. The warranty applies to manufacture and material defects. Wear parts, such as bushings and blades are not warranted against wear during use. Lubricating bushings improves durability. Bushings, blades, and chains are available for delivery as spare parts.

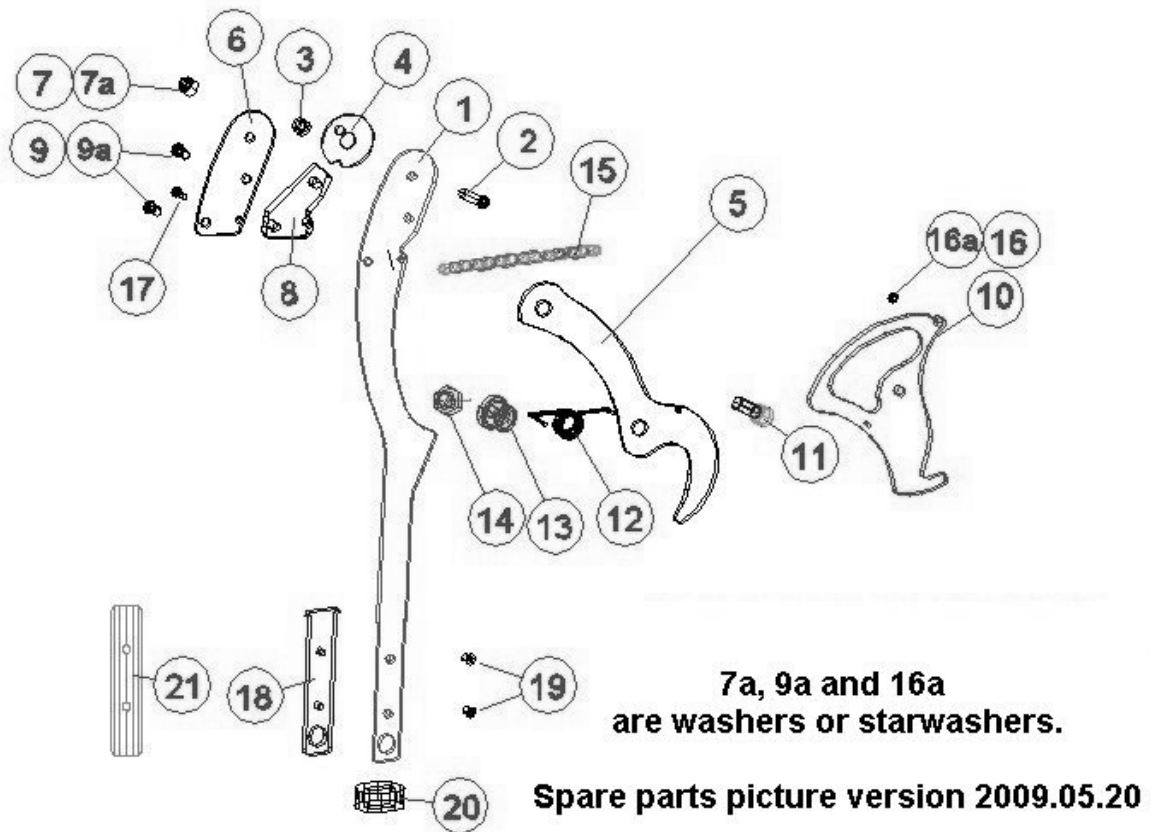
Damages caused by crossing the blades have been removed from the 3-month warranty, as over the years, only a few pruners have been subject to the damage and a satisfactory reason has not been provided. However, it is assumed that activities differing from regular pruning, maybe other types of trials, are the actual reason.

Delivery method:

The actual pruner, which comes standard with a Wolf adaptor, is delivered effortlessly to your mailbox as letter mail. In addition to the device and the user instructions, the letter contains the invoice. The device has seven-day return policy, even if used. The invoice is due approximately 14 days after receiving the device.

Similar to the device itself, we also deliver spare parts using mail.

Falco Karsija pruner device's parts and numbers



Falco Karsija 30 - pruner device's parts and numbers

Components and spare parts of delivered device:

1. frame plate
- 2 M6x20 -screw
3. bushing
- 4 metal plate
5. hook blade
6. front panel
- 7 and 7a M6 Nylocknut and Nordlock underplate
- 8 . spacer plate
- 9 and 9a M6x12 –screw and underplate to fasten the front panel, 2 pieces
10. counter blade
- 11 jointaxle
12. coil spring
13. spring bushing
- 14 M6 nut
15. chain
- 16 and 16a M4x6 screw to fasten the chain to the counter blade
- 17 M4x12 screw to fasten the chain to the frame plate
18. the thickness plate of the Wolf fastener
19. M5 screw to fasten the plate of the Wolf fastener, 2 pieces
20. Plastic protection of the Wolf fastener
- (21. Adaptation part of the BAHCO AP-5M handle (an additional order))
- 20 parts (a regular delivery)

7a, 9a, 16a are washers under the comparable screws.

DOES YOUR FOREST GROW HIGH-QUALITY TIMBER?

GET YOUR OWN TOOL NOW!

KEEP YOUR FOREST NEAT AND PRODUCTIVE!

Are model selection includes*:

Karsija 30, with Wold adaptor, handle not included

Karsija 30, with Bahco adaptor, handle not included

Karsija 30, with 2.1 m wood handle

Karsija 30, with extendable handle by Wolf

* the model number indicates the diameter of the branch that fits into the cutting jaws.

We are constantly developing our products to better meet the needs and requirements of pruners. We would welcome feedback from users of the device, as well as from other pruner enthusiasts.

CE approval:

We are researching the need for CE approval of our product. We have considered the regulations of the European Community when designing, manufacturing, providing instructions for, and packaging the device. If CE approval is to be sought, we will be completing it with future devices.

Manufactured 05/2009.

In Kajaani 2.5.2010

Eero Pikkarainen
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Learn about the functionality of the device at:
<http://www.piksa.fi/Cimkey/Cimkey.html>



Falco 30 -pruningguide

