STIHL

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THE STIHL FELLING AND BUCKING SAW

Types KS 43 and BDN

STIHL

Operating Instructions

Read carefully before taking saw into operation

Maschinenfabrik A. Stihl · Waiblingen/Neustadt

Western Germany

DESCRIPTION

The STIHL Power Saws Types KS 43 and BDN are used for **felling** and **bucking trees.** The saws are identical except for the engine.

Simple handling, top performance, great reliability of operation, low fuel consumption and light weight are features that warrant most economical operation.

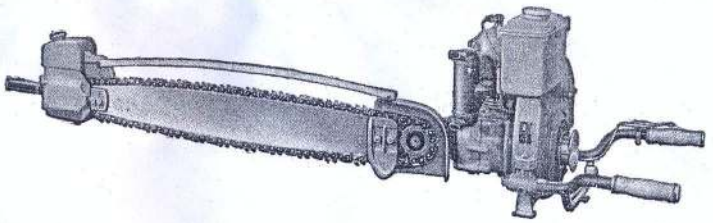
The saw is driven by a light two-stroke gasoline engine produced at our own works. The engine has gasoline-oil mixture lubrication and is started manually by means of a starting rope or with the aid of a starting device which is available upon request.

The required ignition current is generated by a Bosch flywheel magneto mounted in the blower impeller.

The power is transmitted from the engine to the saw chain drive over an automatic centrifugal clutch and a small-size gearing.

The sawing attachment comprises the slip-in guide rail and the endless saw chain consisting of cutting teeth, rakers, blind teeth and the rivets with which the individual chain links are connected. The saw chain is lubricated by means of an automatic oil pump that is accommodated in the hand piece. The pump is driven by the guide pulley.

The sawing attachment can be tilted to permit use of the power saw for the various directions of cut. Notches allow to arrest the attachment in the three different positions that are available.



The STIHL Felling and Bucking Power Saw Type KS 43 without starting device.

TECHNICAL DATA

A. Engine:

	Type 18 B (KS 43)	Type 13 (BDN)
Working principle:	two-stroke gasoline engine	
Number of cylinders:	1	
Cylinder arrangement:	Vertical	
Cylinder bore:	2.679"	2.837"
Piston stroke:	2.679"	2.837"
Piston displacement:	15.07 cu. ins	17.69" cu. ins
Compression ratio:	5.8:1	
Direction of rotation:	Anti-clockwise as seen towards power end of engine	
Engine power:	8.5 hp	10 hp
Mean piston speed:	26.77 ft/sec	28.35 ft/sec.
	at 3,600 rpm	
Crankshaft:	Supported on three roller bearings	Supported on two
Connecting rod:	Piston pin bearing: bronze sleeve Connecting rod bearing: roller bearing	
Ignition system:	Bosch flywheel magneto Type MZ/US 1/138/1	
Ignition:	28° 20'	27° 30'
	= 0.236" from top d. c.	
Breaker point gap:	0.016"	
Spark plug:	18 DIN 72501, heat range	
	145	95
	e. g.	
	Bosch M 145 T 1	Bosch M 95 T 1
	or	
	Beru 145/18	Beru 95/18
Spark plug electrode gap:	0.019"	
Lubrication:	Gasoline-oil mixture	
	During the first 50 operation hours: gasoline/oil 15:1	
	After this period: gasoline/oil 20:1	
Carburetor:	Bing Carburetor Type 1/24 Main jet: 100 Needle jet: 2.68 Needle position: 2nd notch from top	
	Air regulating screw: to open turn through 1½ revolutions approximately.	
Cooling:	The engine is air-cooled by a radial blower mounted on the crankshaft.	
Starting the engine:	manually with a starting device or by means of a starting rope.	

B. Clutch:

Type:	Centrifugal clutch.
Lubrication:	Approx. 3.66 cu.ins of engine oil of group SAE 50.

C. Gearing:

Type:	Single-speed gearing with bevel-gear transmission.
Gear ratio:	1:0.43.
Lubrication:	Pinion grease.

D. Sawing attachment:

	KS 43			BDN			
Cutting length	23½"	31½"	39½"	49"	59"	69"	78¾"
Chain: Number of rakers	49	60	69	81	93	107	120
Number of cutting teeth	49	60	69	81	93	107	120
Number of blind teeth	49	60	69	81	93	107	120
Number of riveting pins	98	120	138	162	186	214	240

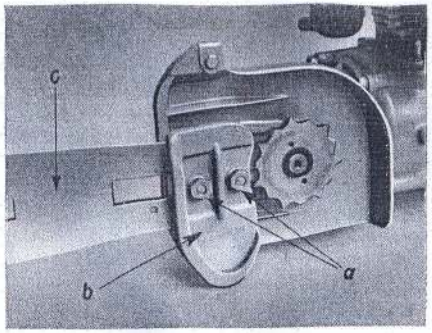
When ordering chains always state number of rakers.

Chain speed: approx. 24.28 ft./sec at 3,600 rpm of the engine.

We reserve the right to make modifications
which may be deemed advantageous or necessary

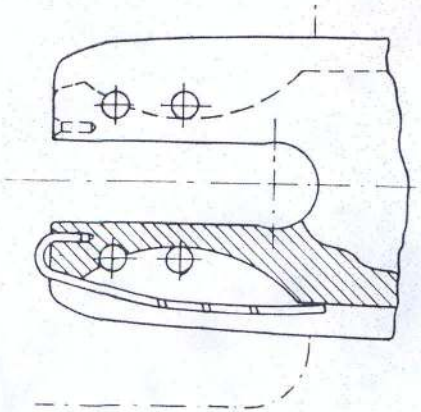
Maschinenfabrik A. Stihl, Waiblingen/Neustadt (Wttbg.)
Western Germany

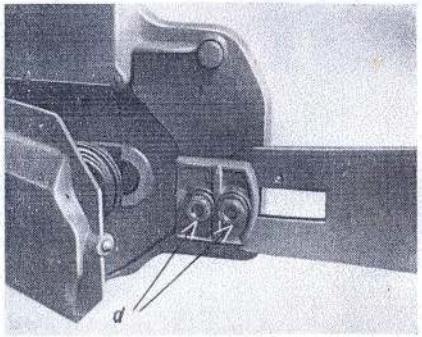
ASSEMBLY



Loosen nuts (a) at bumper counterpart (b). Lift bumper counterpart somewhat and slip slotted end of guide rail (c) on guide bar as far as it will go. Tighten nuts securely.

Either end of the guide rail may be slipped on the guide bar. However, guide rails with a cover spring must be inserted in such a way that the spring is positioned in the lower groove near the hand piece.



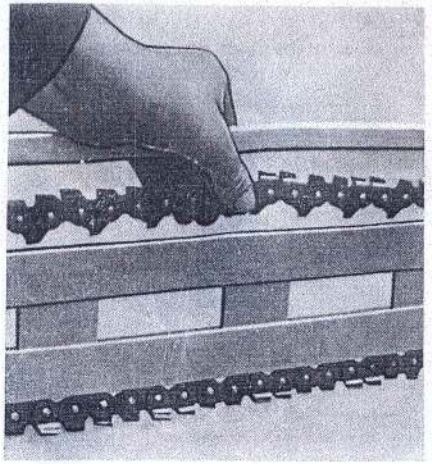


Loosen nuts (d) at hand piece so that the hand piece can be easily slid into the free end of the guide rail up to the stop. Tighten nuts securely.

Place saw chain on chain teeth of gearing and hand piece and on guide rail. The tips of the teeth must point towards the engine.

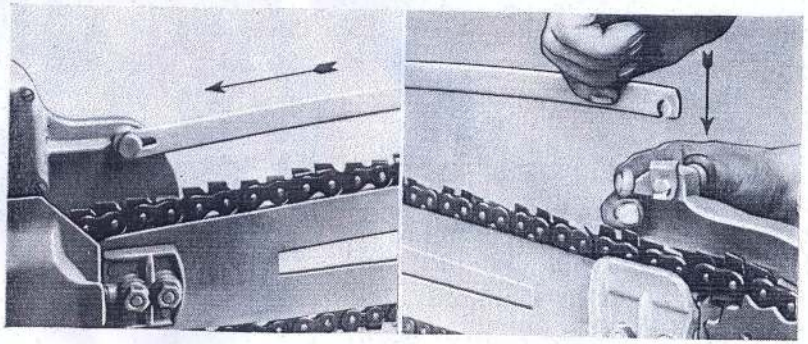
To achieve correct chain tension slacken locking mechanism and turn handle in clockwise direction.

The saw chain must neither be too slack nor too taut. Tension is correct when chain can be lifted 3/8" to 3/4".



Trip locking lever and turn handle clockwise until spring abuts against one of the hexagon faces of the handle.

Attach chain guard.



Insert slotted end of chain guard at hand piece and then hook in at gearing by simultaneously pushing back the press button.

OPERATION

Before taking the saw into operation always check fuel supply in the tank and top up, if necessary. Use only a mixture of branded gasoline and branded oil.

To save the engine the following mixing ratio must be used:

For the first 50 hours of operation 15 : 1
For the following hours of operation 20 : 1

Make it a rule to use only branded engine oil SAE 50 or special oil for two-stroke engines, such as Mobiloil BB or Mobil-Mix TT obtainable from the Vacuum Oil Co.

Mix the gasoline and oil thoroughly in a clean vessel before filling into the tank or use the new two-stroke engine oils with self-mixing qualities.

Mixing chart:

Gasoline liters	Liters of oil to be added at mixing ratios: 15 : 1	20 : 1
25	1.66	1.25
20	1.33	1
15	1	0.75
10	0.66	0.5
5	0.33	0.25
1	0.066	0.05

The mixtures available at filling stations have a mixing ratio of 25 : 1.

To obtain the required ratio of 15 : 1 or 20 : 1 from the commercial mixture add the quantity of oil indicated in the table below.

Mixture 25 : 1 liters	Liters of oil to be added to mixture 25 : 1 in order to obtain a ratio of 15 : 1	20 : 1
25	0.625	0.25
20	0.5	0.2
15	0.375	0.15
10	0.25	0.1
5	0.125	0.05
1	0.025	0.01

Do not use tractor fuel, sometimes called engine kerosene, or Diesel oil or mixtures of gasoline and the above fuels. As the engine is not suited for these fuels, great damage and costly repairs may follow. Guarantee claims for damage resulting from the use of the abovementioned fuels will not be recognised.

Check oil reservoir for adequate supply of lubricating oil for the saw chain and top up, if necessary. Any well-cleaned oil of not too high consistency may be used. In winter operation it may be found necessary to thin the oil with kerosene.

Starting the Engine:

Open fuel cock at supply tank. When cock is opened, handle will point downward. Depress tickler at carburetor cover for 8 to 10 seconds, so that float chamber will be filled.

Do not tickle the carburetor when engine is warm!

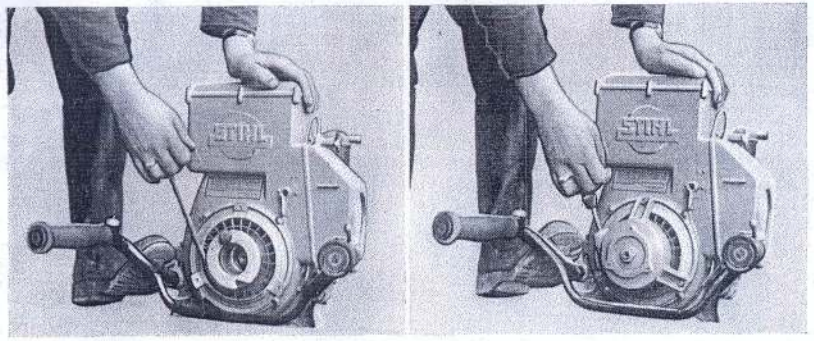
In the case of engines not provided with a starting device secure starting rope in cut-out of starter roller and wind rope in clockwise direction around starter pulley.

Lift hand piece off the ground by placing it on some object so saw chain will not be damaged by sand or gravel.

Open decompression cock one quarter turn.

Open throttle. Place left foot on base of carrying frame. Brace left hand against fuel tank.

Grip starting rope or handle of starting device with right hand and exert a short and vigorous pull.



Starting the engine
with starting rope with starting device

In the case of engines with starting device it is of great importance to pull the handle straight out of the neck. Otherwise the rope will rub at the housing and both the rope and the housing are liable to be damaged.

The starting rope is automatically disengaged from the starting pulley. When a starting device is provided return the starting rope with handle into home position. The rope is wound up by the built-in return spring. Do not allow handle to snap back. It might break!

Should the engine not commence to run after the first starting attempt repeat the whole procedure. When the engine is provided with a starting device see to it that the rope with handle is returned to home position before a new attempt is made. Allowing the rope to snap back and pulling it out again at once endangers the starting device.

After the engine has started shut decompression cock and set throttle to idling position.

In cold weather it is advisable to keep the starter flap at the air filter shut for some time.

If the engine does not start after several attempts refer to section "Remedy of Troubles".

Operating the Engine:

Before making the first cut let engine warm up by running with slow-moving chain. When the throttle is opened the clutch to the saw chain drive is automatically engaged. Do not start sawing before you have made sure that the chain lubrication functions properly.

In no case should the engine be run at high speed or with fully open throttle when no load is placed on it. This will result in damage to the engine for which we must deny any liability.

When the chain is not in the wood, shut throttle at once.

For sawing open throttle only as wide as is absolutely necessary. This will save the engine and reduce the fuel consumption. See to it that during the cut the throttle is opened wide enough so the clutch will not slip; otherwise damage to the clutch and costly repairs will follow.

Do not subject engine to severe duty during the first 50 hours of operation. During this initial period it is recommended to pause shortly after a number of cuts so the engine has a chance to cool down again.

Stopping the Engine:

Set throttle to idling position and shut fuel cock. When short intervals occur depress short-circuit knob until engine comes to a standstill.

When the engine is not run for a lengthy period oil will separate from the fuel-oil mixture in the filled carburetor. As this impedes the starting of the engine, it is recommended to shut the fuel cock shortly before stopping the engine or during the last cut. Thereby fuel line and carburetor are automatically emptied and the engine will die. When proceeding in this manner no fuel is lost and restarting is facilitated considerably.

CARE AND MAINTENANCE

General:

Service life and efficiency of the power saw greatly depend on proper care and maintenance. Make it a rule to remedy all troubles on the spot even if they may appear to be trivial. It is therefore imparative always to carry the tools along with the saw.

It is of utmost importance to clean the engine thoroughly after the day's work. Take special care of the air filter. If required, retighten screws and nuts. Use suitable wrenches to avoid damage and premature wear. Keep saw at a protected place where it is not exposed to the inclemency of the weather.

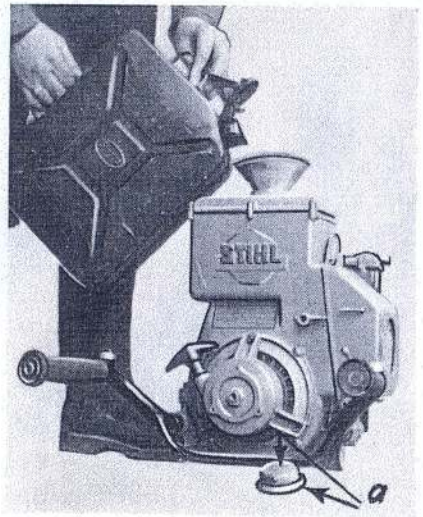
Engine:

a) **Lubrication:**
The bearings and cylinder walls are automatically lubricated with the fuel-oil mixture, so that no special lubrication is required. Strictly adhere to the gasoline-oil mixing ratio. See also page 5.

b) **Fuel tank:**

Always pour the fuel through a fine-mesh strainer to avoid that sawdust, dirt or water will enter the fuel tank.

Keep the openings (a) in the cap unobstructed, so that air can flow into the tank. Otherwise a vacuum will be created in the tank and no more gas will flow to the carburetor.



c) **Carburetor:**
Do not alter carburetor adjustment. Be careful when taking carburetor apart for cleaning. Never clean the jets with metal objects. Use suitable socket-head wrenches for unscrewing the main and needle jets which

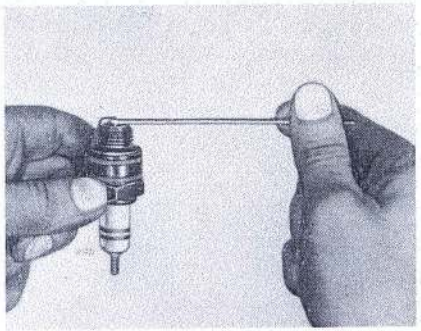
become accessible by removing the mixing chamber locking screw. When cleaning the jets wash all parts in gasoline.

d) **Air filter:**

Dust and dirt are harmful to the engine and lead to excessive wear. It is therefore imparative to remove the filters after the day's work and wash in gasoline. Dip them in engine oil of low viscosity and let oil drip off.

e) **Spark plug:**

The engine of Type KS 43 has a spark plug of heat range 145, while the engine of Type BDN is equipped with a spark plug of heat range 95. Both plugs have thread M 18 x 1.5 and a width over flats of 1$^1/_8$". These spark plugs are intended for normal operation. In hot weather and for continuous operation, i.e. when the engine is operated under full load over a lengthy period, it is recommended to use spark plugs with the next higher heat range, e.g. 175 for Type KS 43 and 145 for Type BDN.



Check electrode gap every 100 hours of operation. Adjust to 0.0197" (0.5 mm). When the electrodes are badly worn install a new plug. The isolator of the middle electrode should look light brown to grey brown. On the housing only a slight formation of rust or a light-grey tinged lead deposit are tolerable.

f) **Muffler:**

When the output of the engine drops check whether soot or oil carbon have accumulated in the muffler. Unscrew muffler, burn out and hammer. Clean exhaust port in the cylinder with great care.

g) **Air cooling:**

Keep strainer at blower housing unobstructed to ensure adequate supply of cooling air. Check daily. See to it that the cooling fins are always clean as only then maximum cooling effect will be achieved.

Clutch:

Drain oil every month in warm condition. For this purpose remove oil filler plug and oil drain plug. After returning the oil filler plug fill in approx. 3.66 cu.ins of branded engine oil of group SAE 50, such as Mobil-oil BB of the Vacuum Oil Co.
The oil level should never be too high, otherwise clutch trouble will develop.

Gearing:

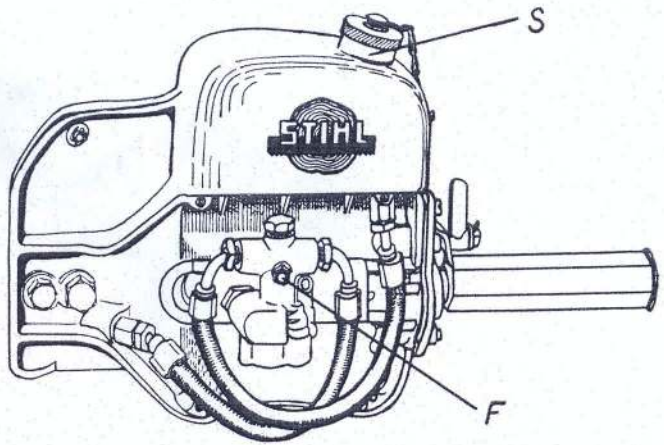
Check supply of pinion grease weekly or daily (in heavy duty) by cutting off with a clean rod inserted through the filling hole. Minimum depth is $^3/_8$", normal depth 1". Replenish grease if necessary. Use only branded pinion grease, such as Mobil Epix obtainable from the Vacuum Oil Co.

Tilting Head:

Once a week force water-repellent grease, such as Mobilgrease No. 4 of the Vacuum Oil Co., with grease gun into the lubricating nipple provided on the side.

Sawing attachment:

It is very important that the saw chain is properly lubricated all the time. Check oil level of oil reservoir and refill. It is recommended to replenish oil every time the fuel tank is topped up.
For lubrication of the saw chain any well-cleaned oil of not too high viscosity may be used.
When it is found that the oil level has dropped a little only or not at all, this indicates that the lubricating system does not function properly. Check system. Clean oil reservoir, oil pump and oil line as well as oil duct and groove of guide rail and wash with gasoline. Keep breather hole of reservoir unobstructed.



For cleaning the oil reservoir, loosen retaining screw (S) of oil strainer and turn oil strainer, which is provided with a thread, out of the reservoir.

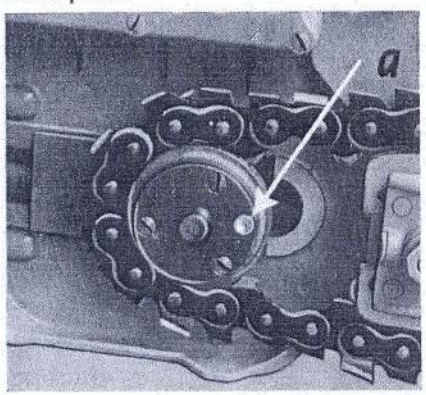
When mounting and dismounting the oil pump give the lead screw (F) special attention. See also page 25.

It is recommended to reverse the guide rail every week, so that all four sides are used. This ensures that the rail wears down uniformly.
When reversing the guide rail be sure to remove saw dust and rosin that might have entered the oil duct in the groove on the underside of the guide rail near the hand piece.

If the saw features a guide rail with cover spring see that the spring is always located in the lower groove on the far end of the guide rail. The cover spring prevents clogging of the oil duct through the ingress of saw dust and other matter. When reversing the rail, do not forget to transfer the spring. Clean lubricating groove, pull cover spring out with a pair of pliers and insert into the correct groove. Be careful not to deform the spring.

Keep the saw chain over night in an oil or kerosene bath. Store the spare chains in the same bath. For installing take the saw chain out of the bath, hang it up for some time and allow the oil or kerosene to drip off.

Hand piece:



Lubricate guide pulley at hand piece weekly. Use a grease gun to force water-repellent grease into the lubricating nipple (a).

From time to time clean threads of tightening fork and tightening fork guide and oil.

When the machine is heavily used, it is necessary to lubricate the above-mentioned points more frequently.

Laying the power saw up:

If the saw is to be laid up for a lenghty period it is advisable not only to carry out the above maintenance jobs, but also to protect the engine against corrosion.

Before final stopping of the engine open carburetor cover, shut fuel cock and inject corrosion-preventing oil, such as Sova-Kote 501 D obtainable from the Vacuum Oil Co., through the intake pipe of the carburetor with a squirt can. Shorten the ignition system during injection so the oil can also afford protection to the walls of the combustion chamber which are still warm.

FELLING AND BUCKING

Principle:

Never work without chain guard.
Hold power saw in desired direction of cut.
Place bumper against tree with chain moving slowly.
Open throttle and cut in evenly. **Do not tilt the power saw!**
Never carry a running saw; lock throttle in idling position.
The engine operator must always walk forward.
See that chain tension is correct.

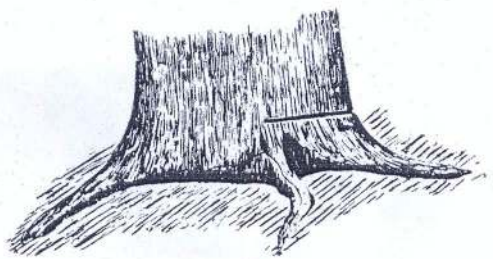
Felling trees:

Proceed in the same way as if you were using a hand saw. Remove the earth around the base of the tree. If necessary, saw off obstructive roots. Tilt guide rail into horizontal position. Loosen lock lever at tilting head. Tilt hand piece clockwise, and at the same time move lock lever back.

Continue to tilt the hand piece until lock lever clicks.

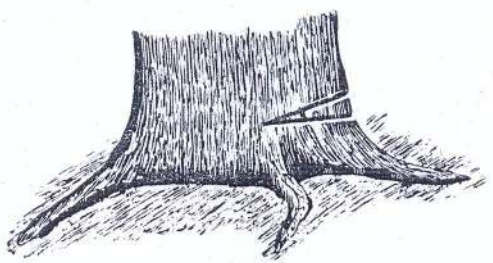
First the notch controlling the direction of fall is cut.

The notch is made by two cuts in a wedge-shaped pattern.

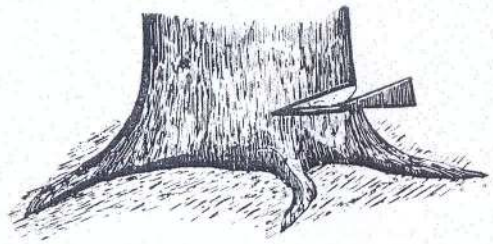


Make lower cut horizontally or slightly upward.

Then make inclined upper cut.

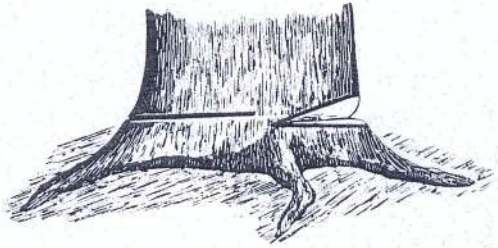


Remove wedge-shaped piece of wood. If necessary use back of axe to drive it out.



The notch should be located as near to the ground as possible to obtain a low stump.

Unlike in leaf wood the notch in coniferous wood should not be too deep except when the lean of the tree indicates a tendency to split. As a rule a notch depth of a fifth to a sixth of the tree diameter will do.



The back cut should run to the center of the notch.

It is a good idea to mark the back cut with chalk when felling thick trees for the first time. You may also place an axe in the notch to guide you. The back cut must never be higher or lower than any part of the notch, but should be made horizontally above the center and below the top edge of the notch.

The back cut should run strictly horizontal to the notch and must not be inclinded. Otherwise the direction of fall is no longer properly controlled. Do not cut through to the notch. Leave a band of wood, the so-called hinge, over which the tree tips. If this precaution is not taken

You are courting diaster!

The man at the hand piece must see to it that the saw is advanced uniformly. A rocking motion of the power saw in felling trees and bucking must be definitely avoided.

The moment the tree starts to tip pull the saw out of the back kerf with the chain running. Set throttle to idling position and retreat sidewards with chain at a standstill. Be careful to escape falling branches and watch out whether the tree spins, breaks off or slits.

When felling, bucking and limbing split trees, rolled timber, twin trees etc. proceed with greatest care to avoid accidents and damage.

Bucking logs:

Bring power saw into bucking position. Guide motor bumper to site of cut with chain moving at low speed. Then open throttle and start cut. Be sure bumper is tight against the tree; otherwise the saw will jerk forward sharply. **Danger!**

Do not start the cut with a jerk! The chain might break!

After completing the cut pull out of kerf with chain running and shut off the power.

If pinching develops, drive wooden wedge into the kerf or pry up log. In thin logs where no wedge can be used it is best to make a V-cut.

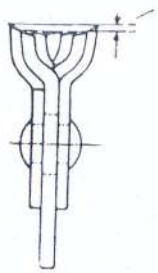
Undercuts with the upper side of the guide rail are handy on logs supported at both ends. Remove chain guard! Increase tension of chain a bit and place hand piece of saw against tree. Hold machine firmly! To prevent that the log splits make a short cut from above. Open throttle during the undercut.

Never carry a running saw. Lock throttle in idling position.

When bucking logs at a slope see to it that engine is always above the trunk.

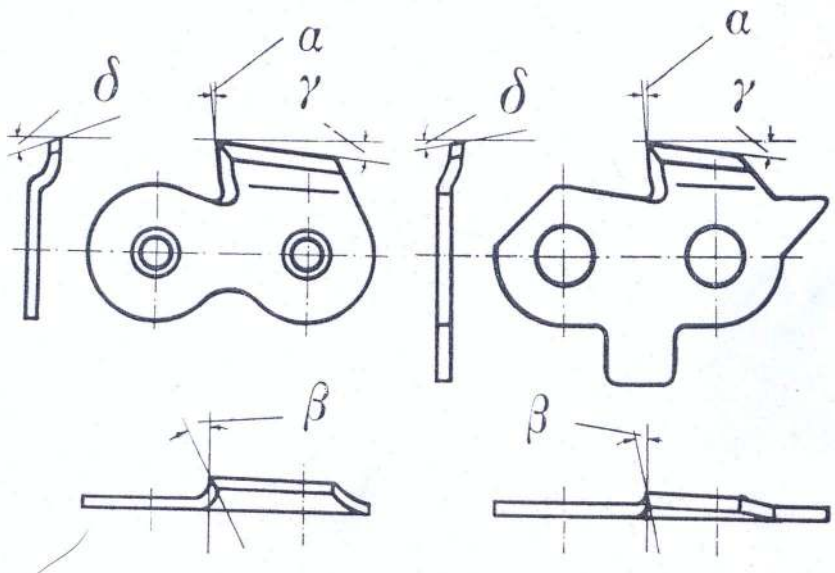
When the above instructions are strictly adhered to and after some practice it is easily possible to fell and buck trees up to a diameter of 78 3/4".

Angle Data for Sharpening the Saw Chains



0.019″ to 0.027″ (0.5 to 0.7 mm) vertical distance between cutting teeth and rakers.

Cutting Tooth **Raker**



Cutting teeth			Angle	Rakers		
factory setting	hardwood	softwood		factory setting	hardwood	softwood
2°	0°	4°	Face angle (α)	2°	0°	4°
25°	22°	28°	Face cutting angle (β)	10°	8°	12°
7°	7°	7°	Back angle (γ)	7°	7°	7°
20°	20°	20°	Back cutting angle (δ)	10°	10°	10°

SHARPENING THE SAW CHAIN

Do not work with blunt chains. The result will be increased pressure of the saw chain on the guide rail which overheats, loses in hardness and is worn down prematurely. Cutting with a dull chain leads to higher fuel consumption and greater physcial strains. Whenever the cutting capacity drops noticeably it is necessary to exchange the blunt chain for a sharp one. When cutting frozen wood it is urgently recommended to replace the saw chain more frequently. The edge-life of the chain depends on the species of wood to be cut.

The saw chain is composed of staggered right and left-hand set cutting teeth, right and left-hand set rakers, rakers with no set, blind teeth and rivets connecting the chain links.

For easy, speedy and accurate reconditioning of saw chains the use of a sharpening apparatus is recommended.

Principle: Sharpen frequently, take little material off!

After placing the saw chain on the sharpening apparatus do not recondition the individual teeth in one go, but with short interruptions. Otherwise the hardness of the teeth will deteriorate.

First sharpen all cutting teeth bent right, and then all cutting teeth bent left, or vice versa — and after this go over the rakers.

As a rule only the faces of the teeth are sharpened. Do a uniform job or the height and set of the teeth will be irregular. The various angles are shown in the drawings on the facing page; the degrees to which the sharpening apparatus is to be adjusted are indicated in the sharpening chart.

The factory setting of the chains is suitable for cutting both hard and soft-wood. If the saw is mainly used in handling softwood it is advisable to choose a more acute face cutting angle. The rakers must always be 0.019″ to 0.027″ (0.5 to 0.7 mm) lower than the cutting teeth.

For cutting frozen wood it is recommended to choose the face and face cutting angles approx. 2° more obtuse than indicated in the chart. Therefore the factory settings given in the chart apply to softwood, whereas for cutting hardwood the following angles have been found to be most favourable:

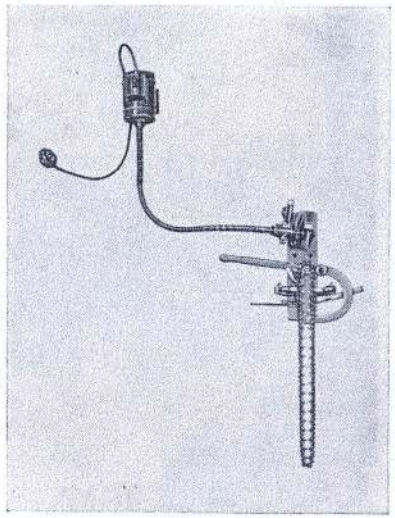
Face angle	approx. —2°
Face cutting angle	approx. 6° for the rakers and
	approx. 18° for the cutting teeth.

Should a tooth be badly damaged, insert a new one and grind down at the face until it has the same length as the other teeth. If this is not done, the saw chain will chop or run untrue.

Replace damaged rivets at once or the chain will stretch to such a degree that the pitch of the chain is no longer identical with the pitch of the sprocket wheel. The result would be irregular running of the power saw and rapid wear of saw chain, guide rail and sprocket wheel. When inserting new rivets make sure the links do not stick.

After the saw chain has been restored it is imparative to put the chain in an oil or kerosene bath. Thereby the links are thoroughly oiled and the chain life is considerably extended. Before putting the chain on again, hang it on a peg and allow the oil or kerosene to drip off.

It is urgently recommended to use Original STIHL Patented Saw Chains, as other makes have a deviating pitch and will lead to damages. STIHL Saw Chains are backed by many years of experience and incorporate the most recent technical findings. Guarantee claims for damage can only be considered when Original STIHL Patented Saw Chains have been used exclusively.



Sharpening Apparatus Type HKS
with electric motor

The sharpening apparatus, which is easy to adjust and operate, permits speedy and accurate sharpening of saw chains.

The outfit is driven by a small special-type motor operating on 220 volt A.C. Upon request motors for other types of current will be supplied.

Where no power is available the grinding wheel can be driven by the engine of the power saw over a gearing with flexible shaft.

SAFETY RULES

By working with utmost care and strictly adhering to the safety rules it will be possible to further reduce the number of accidents in lumbering operations.

When power saws are used, the supervising personnel must constantly strive to prevent accidents by pointing out the dangers and urging the operators to take any conceivable precaution.

In addition to the safety rules governing work with hand saws the following rules should be strictly followed:

1. Do not smoke when filling in fuel!
2. When tilting guide rail into felling or bucking position, do not grip chain.
3. Retreat sidewards the moment the tree starts to tip. Watch out for falling branches!
4. **Never** carry a saw with running chain!
5. When sawing place motor bumper tight against tree, otherwise the saw will jerk forward.
6. Be careful when sawing split wood. Cut-off pieces of wood might be torn along with the chain. The man at the hand piece must be especially cautious.
7. Be careful when cutting thin stock that is held or fed into the saw by a third person.
8. Take care when carrying the power saw over snow and ice or on slopes.
9. When carrying the power saw, the engine operator must always walk forward.
10. See to it that the various saw teams do not work too close together. The engine noise will kill any warning cries.
11. When working on slopes the engine of the power saw must always be above the log to be cut.
12. **Never** check chain tension with running engine.
13. Stop engine before changing the saw chain.
14. Work with care and calm! Before making the back cut, convince yourself that nobody will be endangered by the falling tree.
15. Do not operate saw without chain guard.

TROUBLES AND THEIR REMEDY

To trace down troubles quickly and effectively, proceed in the indicated order.

A) **Engine:**

I. **Starting troubles:**

Fuel supply is interrupted:

Fuel cock shut.	Open cock.
Fuel tank empty.	Fill tank up.
Fuel line clogged.	Disconnect and clean line.
Needle valve in carburetor clogged.	Clean valve.
Jet clogged.	Remove and blow out jet.
Idling jet clogged.	Clean jet.

Fuel supply functions but engine fails to start:

a) **Spark plug does not deliver a spark after it has been removed and placed on grounded part of engine:**

Spark plug dirty, fouled or soot-covered.	Clean with gasoline and spark plug brush.
Spark plug faulty.	Replace spark plug.
Cable connection poor.	Bare wire. Tighten connection.

b) **No spark showing at cable when cable is held without spark plug 0.08 to 0.12" (2 to 3 mm) away from cylinder:**

Circuit breaker oily or dirty.	Clean circuit breaker with gasoline.
Breaker arm stuck or deformed.	Replace breaker arm.
Breaker point gap incorrect.	Adjust to 0.016" (0.4 mm).
Breaker points burned.	Clean points or replace, if necessary.
Cable broken.	Renew cable.
Cable insulation faulty, cable grounded.	Insulate cable.

c) **Plug develops sparks:**

Spark plug electrode gap too wide.	Set to 0.019" (0.5 mm).
Ignition timing incorrect.	Have timing set to specifications.
Float chamber flows over.	Remove foreign matter from float needle. Put needle back into clamping spring. Eliminate leaks in float.

Carburetor loose or hanging out of the perpendicular.	Tighten in upright position.
Engine getting secondary air at carburetor connection, cylinder-head gasket or plug seat.	Rub oil on point in question and crank engine. Bubble formation indicates secondary air and calls for sealing.
Piston rings seized.	Have rings freed by a qualified mechanic.
Fuel containing water.	Drain fuel. Clean carburetor, especially jet.

Engine is reluctant to start in cold condition:

Idling adjustment too lean.	Turn air regulating screw clockwise.
Secondary air present.	See preceding paragraph.

Engine is reluctant to start in warm condition:

Tickler has been actuated too often.	Shut fuel cock. Crank engine several times with fully opened throttle. If engine still refuses to start, crank a few times with spark plug and drain plug at crankcase removed. Then return spark plug and drain plug, start engine without actuating the tickler and open fuel cock.
Idling adjustment too rich.	Turn air regulating screw anti-clockwise.
Fuel level in jet is too high; cause:	
Carburetor out of the perpendicular.	Hang straight.
Float needle sticking.	Free needle.
Float leaking.	Place float in hot water. Solder holes indicated by air bubbles. Use as little solder as possible, otherwise the float will be too heavy.
Float needle worn out.	Replace needle.

Engine starts but stops after a short time:

Carburetor empty.	Fill up fuel tank. Open fuel cock.
Fuel containing water.	Drain fuel. Clean carburetor, especially jet.

Engine starts but stops again when throttle is opened:

Engine too cold.	Let engine warm up.
Jet or fuel line clogged.	Clean jet and fuel line.
Poor carburetor adjustment.	Adjust carburetor properly.

Engine starts but detonations develop in the carburetor (spluttering or sneezing) when throttle is opened:

Engine too cold; air-fuel mixture not containing sufficient fuel.	Let engine warm up and enrich mixture.
Jet clogged or too small.	Clean or use larger jet.
Poor carburetor adjustment.	Adjust carburetor properly.
Ignition timing late.	Have ignition timing adjusted.
Leak in suction line.	Eliminate leak.

Engine starts but runs irregularly, does not reach full speed and sputters when throttle is opened:

Air filter contaminated.	Clean filter.
Ignition misses.	Spark plug fouled or sooted up.

Engine runs normally but detonations develop in the exhaust pipe:

Ignition misses.	Spark plug fouled or sooted up.
Oil-fuel mixture too lean.	Enrich mixture with oil.

II. Operating Troubles:

Engine troubles are in most cases caused by the coincidence of several causes. Check on all possible causes or contact my appointed agent, a qualified shop or my works as soon as the engines behaves irregularly.

Engine knocks or pings:

Ignition timing early.	Check ignition timing.
Ignition by incandescence caused by glowing spark plug parts.	Use prescribed spark plug.
Ignition by incandescence caused by glowing oil carbon.	Clean crown of piston and cylinder head.
No knockproof fuel used.	Clean muffler and passages.
Muffler or exhaust passages clogged.	Use branded gasoline only.
Bearings worn.	Have bearings examined.

Engine overheats and develops insufficient power:

The causes described under "Engine knocks or pings" may be responsible.

Ignition timing early.	Have ignition timing checked.
Unsuitable oil used.	Use specified oil.
Cooling fins dirty.	Clean fins.
Air filter contaminated.	Clean filter.

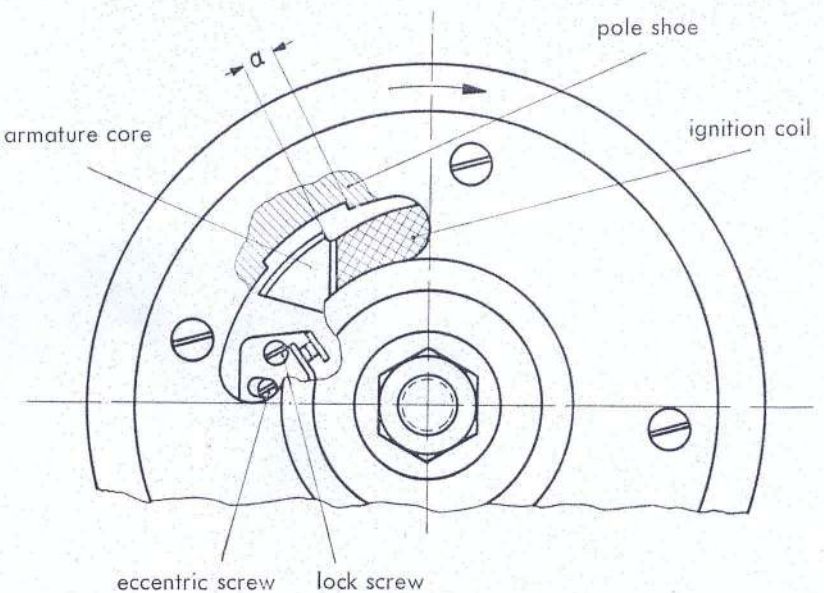
Engine dies:

Check on all the causes dealt with under "Engine is reluctant to start". Proceed in the indicated order.

Carburetor troubles are characterised by previous **irregular** running of the engine. Lack of fuel is indicated by splashing noises from the carburetor.

Ignition trouble in most cases is indicated by a sudden missing of the engine. If this happens, check whether foreign matter has accumulated between the spark plug electrodes (oil carbon or deposits from lead-containing fuels). Spark plug will then be shorted, so it cannot deliver sparks.

It is recommended to have ignition system and ignition timing checked at a qualified shop. The below sketch shows the position of the armature core in relation to the pole shoe in which the circuit breaker points begin to open; a = 0.236 to 0.393" (6 to 10 mm).



Should the checks yield no result, have ignition system repaired at your nearest Bosch agency or send in to my works.

Engine stalls:

Let engine cool down. If it is found impossible or very hard to crank the engine, spray some kerosene — or a fuel-oil mixture — into the cylinder and try to free piston. Proceed with utmost care. Have engine examined.

Cause: Insufficient or no oil in the fuel.
Too high an engine speed without load.
Engine overheated due to too lean carburetor adjustment.
Therefore use only the prescribed jet.

B) **Sawing Attachment:**

Saw chain pinched or pulled out of line:

Saw chain blunt or not being resharpened uniformly.	Put on resharpened chain.
Contact surface of guide rail uneven or badly worn on one side.	Recondition or send in to factory for restoring and truing.

Saw chain jumps sprocket wheel teeth:

Chain slack.	Retighten. If this is no longer possible, remove one link.
Sprocket wheel defective.	Replace sprocket wheel.

Chain saw chops:

Chain teeth not uniformly high.	Bring teeth to uniform height with sharpening apparatus.
Chain links bind.	Put chain in kerosene-oil bath.
Chain tooth broken.	Replace tooth.

Saw chain does not stop when engine idles:

Idling adjustment too high.	Correct adjustment.
Clutch springs broken or slack.	Renew springs.

C) **Chain Lubrication:**

Chain Lubrication fails:

Air inlet passage of oil reservoir clogged.	Free passage.
Oil lines clogged.	Wash lines in gasoline.
Oil duct in guide rail clogged.	Clean duct.

SHOP AND ASSEMBLY HINTS

In the following a few hints for assembling and disassembling the power saw are given.

Oil pump:

When reassembling the oil pump see that the lead screw is located in the guide groove of the plunger. Otherwise the lead screw will lock the plunger. This would inevitably lead to a failure of the lubricating system as the plunger could then longer move.

Carburetor:

Do not clean jet holes with metal objects! Use only bristles or the like. It is best to blow out the jets.

Pulling the flywheel:

Remove starter roller after unscrewing retaining screw SW 41. Take down blower housing cover with protective strainer (four oval-head countersunk screws). Remove blower impeller after screwing out the four cheese-head screws. Remove spark plug. For this purpose turn in stop screw (Ref. No. 178 A — 01) which is available as an extra. When the crankshaft is rotated the piston will abut against the stop screw. This prevents the shaft from turning any further. Screw retaining screw for starter roller into the flywheel. Loosen crankshaft nut with socket wrench SW 22. Left-hand thread! Continue to turn nut so that flywheel is pulled from tapered end of crankshaft. Be careful not to lose the key.

Clutch:

The gearing can be taken off after the four hexagon nuts M 8 have been removed. When dismounting clutch drum and follower star first remove retaining rings from shafts and then draw parts off with puller.

Never start engine with gearing dismounted. The centrifugal weights would fly off. **Danger of accidents!**

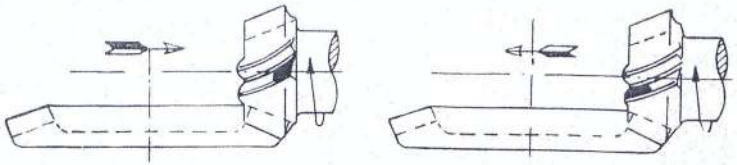
To facilitate assembly make hubs of clutch drum and follower star hand-warm. However, the hardness of the springs should not suffer due to excessive heating.

Gearing:

The bevel gears must always bear identical distinguishing marks. Therefore only pairs of gears will be supplied when replacement parts are ordered. Always install gears so that correct flank contact is achieved irrespective of whether tooth ends are flush or not.

To check flank contact apply a thin coat of Paris blue or a similar colour to the tooth flanks of the spur bevel gear. Turn pinion several times in working direction and at the same time brake spur bevel gear somewhat. The contact images will then appear on the tooth flanks of the pinion.
The flank clearance (backlash) should be approx. .0079".

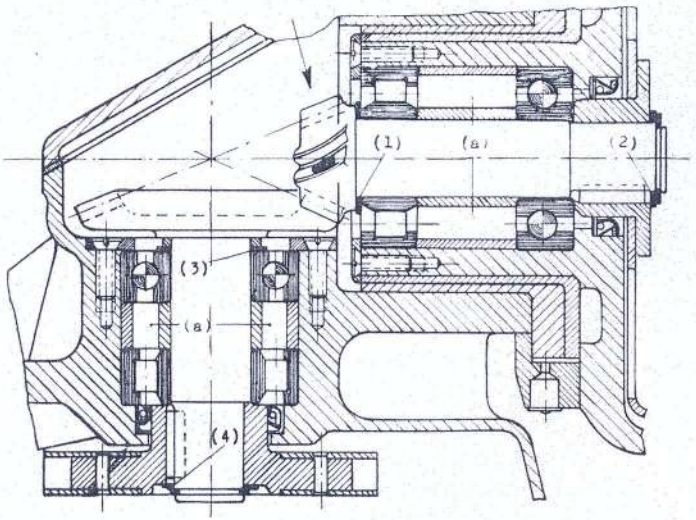
Should one of the contact images depicted below appear, turn driving pinion in the direction of the arrow until the correct image as depicted in the cross-sectional drawing at the bottom of the page is achieved.



Proceed as follows:

Take out shims at (1) and add at (2). Take out shims at (4) and add at (3)	Take out shims at (2) and add at (1). Take out shims at (3) and add at (4)

until correct tooth backlash of approx. .0079 is obtained.



Cross-sectional drawing of gearing

When assembling the gearing, fill the spaces (2) between the bearings with good acid-free bearing grease. At the same time fill the hollow spaces between the bearing rollers or balls with the same grease.

Chain sprocket wheel:

To dismount sprocket wheel start with removing guide bar. Then remove retaining ring on shaft and pull sprocket wheel with puller.

Before mounting the sprocket wheel take off gear case cover. Tilt engine with gearing and support spur bevel gear. Make sprocket wheel hand-warm. However, be careful that the hardness of the wheel does not suffer. Put on sprocket wheel.

If the spur bevel gear is not supported, the gear and pinion will be in danger of being damaged.

IMPORTANT!

The service life and operating safety of the chain saw depend greatly upon proper handling and careful maintenance.

No responsibility will be accepted for damage resulting from non-observance of instructions contained in this manual.

Satisfactory working of the STIHL Power Chain Saw is assured only if

Original STIHL Spare Parts

are used. Therefore the exclusive use of "Original STIHL Spares" for repairing STIHL Power Saws is urgently recommended.

Please write here the number of your power saw:

Power Saw No.	

When inquiring about, or placing orders for spare parts, please state complete serial number of the saw, quantity of parts required as well as designation and Ref. No. given in the parts list. In the event of doubt send the old parts in as samples. Your kind cooperation in the above will enable me to give prompt attention to your requirements.

If you experience any trouble with the power saw or require advice, please apply for assistance to the appointed STIHL agent or a qualified repair shop, or write direct to my works.

Name and address of apointed STIHL agent: