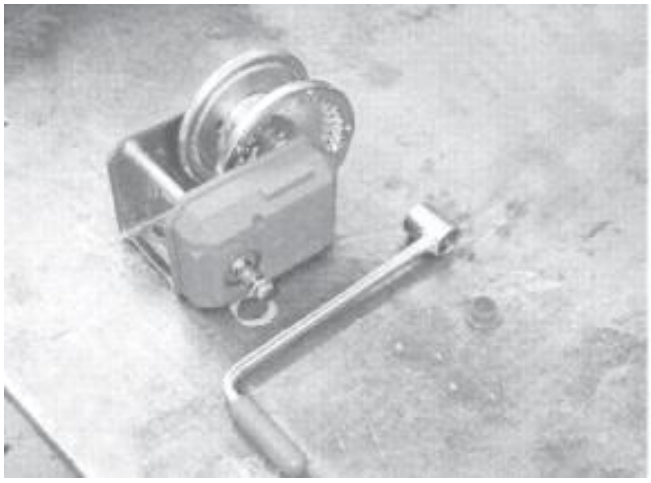
5 Safety winches

5.1 Function and Constrution of Winches

5.1.1 Function

The winch is used for lifting and hauling loads.

To avoid uncontrolled lowering of the load, all winches have an automatic load-pressure brake.



If less than the minimum weight is lifted, uncontrolled lowering of the load may occur.

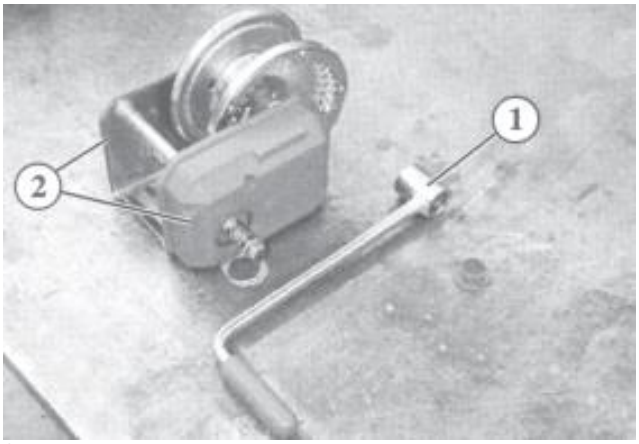
The load-pressure brake only becomes effective after correct pre-tensioning by turning the crank several times.

Under load, at least two turns of cable (turns of strap) must be left on the drum.

Types 901 A and 1201 A have an auto-unwind device. The cable or strap can be speedily unwound when the crank is removed.

Caution. Wire cables can cause injury. Always wear gloves.

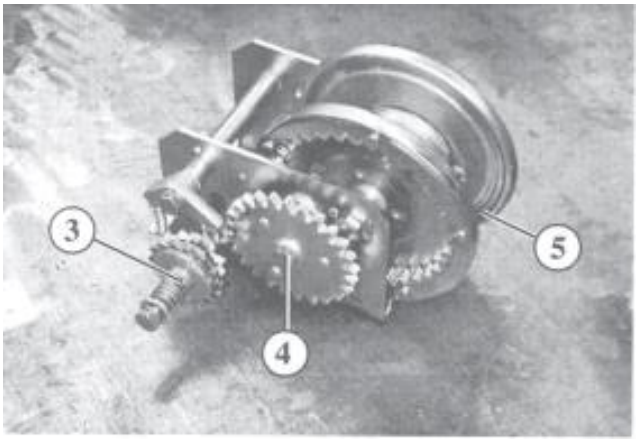
To prevent release of the load-pressure brake, the crank must be left on the drive shaft when the winch is used with a suspended load.



5.1.2 Construction

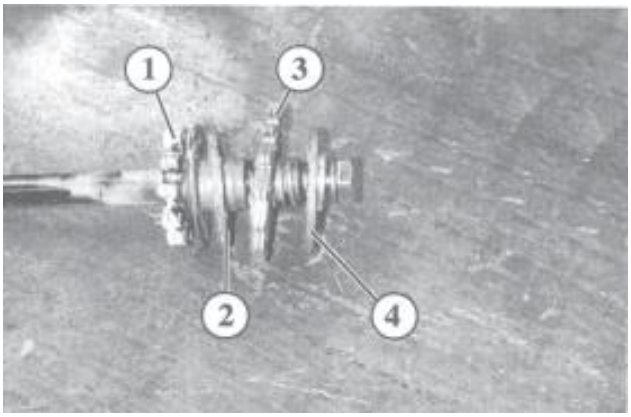
The winch consists of the following assemblies:

- Crank handle (1)
- Cover (2) to protect the gearing and brake mechanism



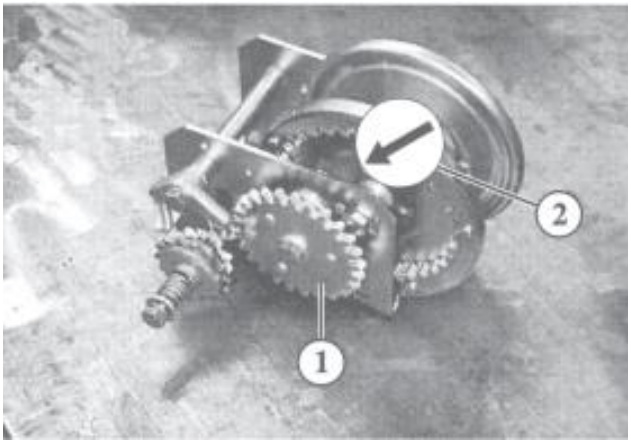
- Drive shaft (3)
- Intermediate shaft (4)
- Drum (5) to take up the cable or straps

The intermediate shaft (4) is omitted on types 351 and 501. In those cases, the teeth on the drum (5) face outwards instead of inwards.



The drive shaft comprises the following assemblies:

- Transmission pinion (1)
- Inner brake disc (2)
- Ratchet wheel (3) to engage the pawl
- Outer brake disc



The intermediate shaft comprises the following assemblies:

- Gear wheel (1)
- Intermediate pinion (2)

5.2 Maintenance

5.2.1 Checking the cables and straps

Cables and straps must be checked regularly for wear or damage and if necessary replaced immediately.

Checking criteria for cables

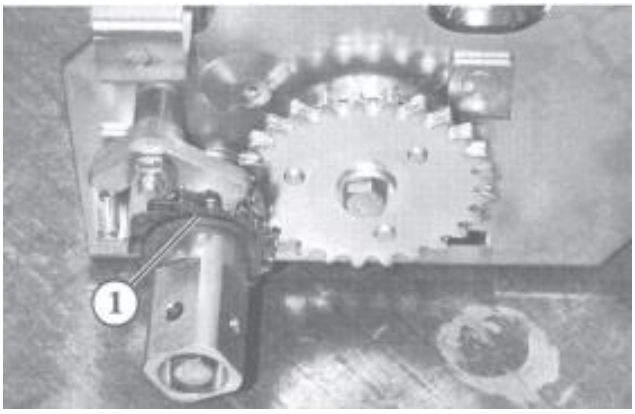
- Examine for
  - Crushed areas
  - Breakage of individual wires

Checking criteria for straps

- Examine for
  - Abrasion
  - Cracks
  - Breakage of fibres

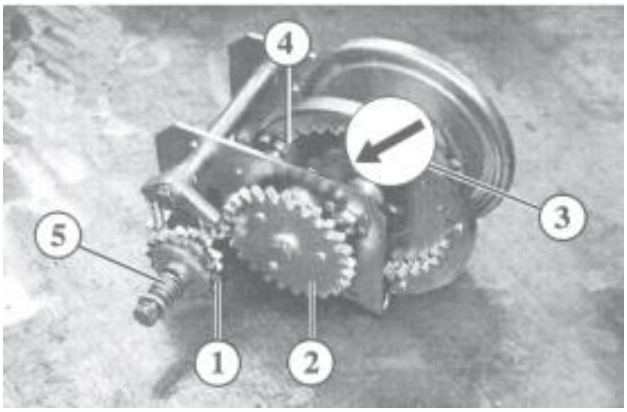
5.2.2 Compulsory specialist check (at least once a year)

In accordance with the UVV "Winches, lifting and hauling gear" (VGB 8§23) , the winch must be checked at least once a year by a specialist. Depending on the conditions of use (frequency of use) and operating conditions, more frequent testing may be required.



5.2.3 Maintenance work

On all models, make sure that the brake discs (1) do not come into contact with oil or grease.

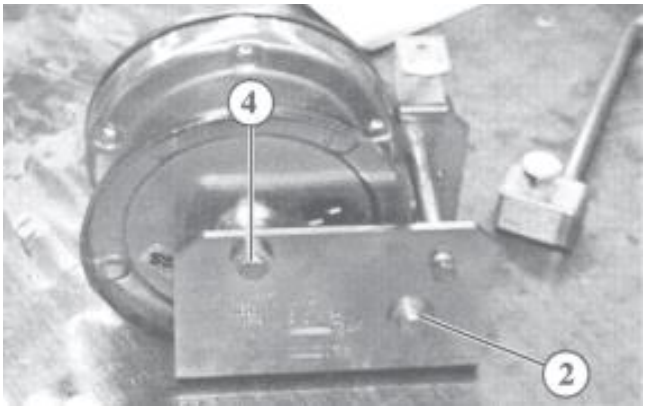


Models with loose brake discs are assembled as standard with graphite paste (Klüber company, Wolfracoate 99113)

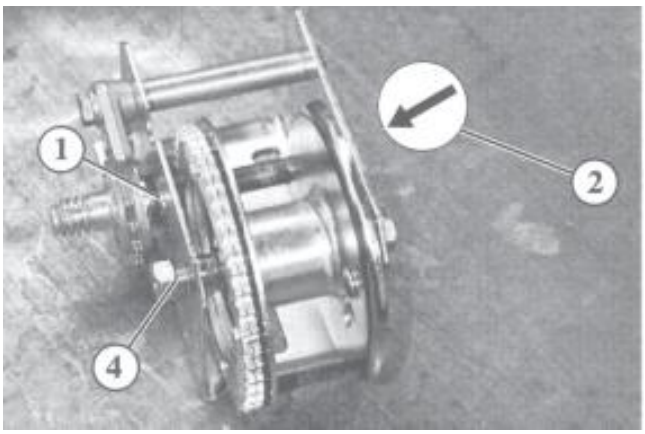
No other lubricants are permitted.

Lubrication with oil

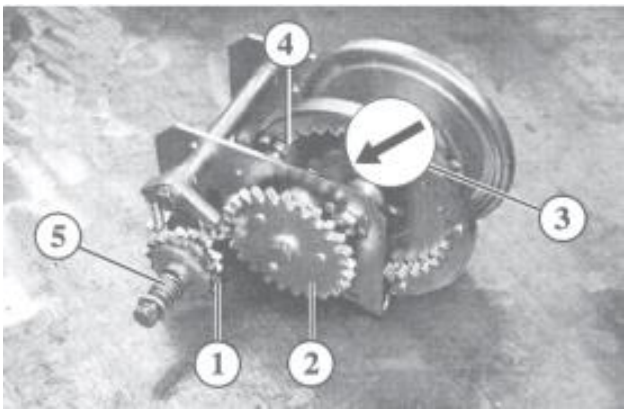
- Regularly oil the bearing bushes (1,2) of the drive shaft
- Regularly oil the bearing bushes-needle bearings of the intermediate pinion (3)
- Regularly oil the bearing (4) of the drum hub



- On the back, also oil the bearing bushes of the drive shaft (2) and the outer surfaces of the shaft (4)



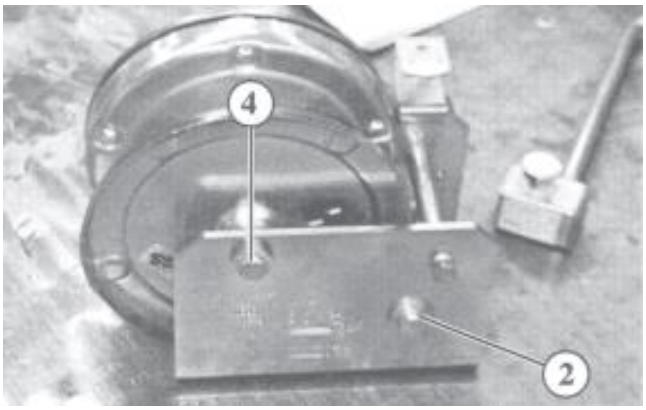
On type 501, the intermediate stage is omitted.



Lubrication with grease

- Regularly grease the tooth flanks of the gear wheels (1-4)
- Grease the acme thread of the crank mounting (5) regularly and adequately

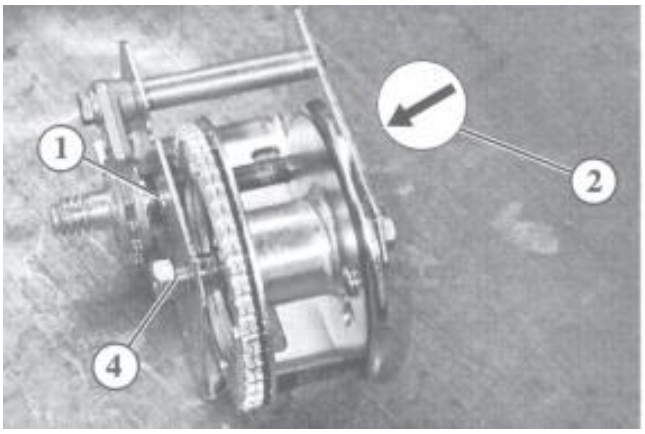
On all models, make sure that the brake discs (1) do not come into contact with oil or grease.



Cleaning dirty screw threads

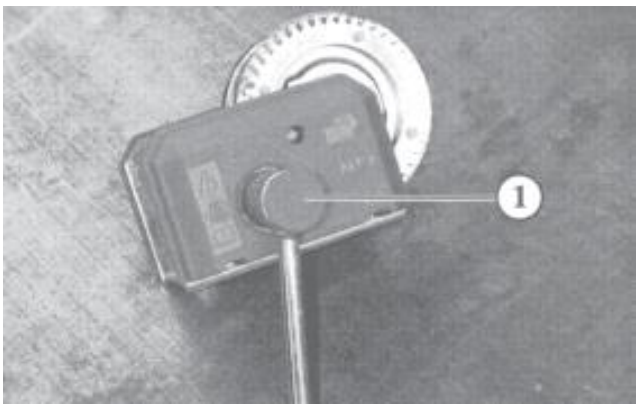
- Regularly clean the acme thread on the crank mounting

On models 901A and 1201A



- Grease the acme thread (1) of the crank mounting (crank nut) regularly and adequately, removing the crank and un screwing the crank nut for this purpose.

On all models, make sure that the brake discs (1) do not come into contact with oil or grease.

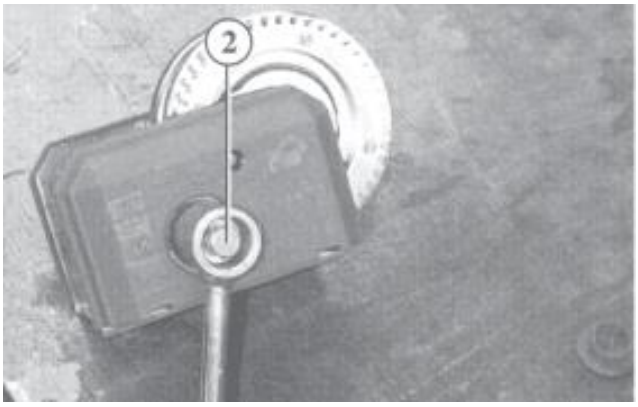


5.3 Repair

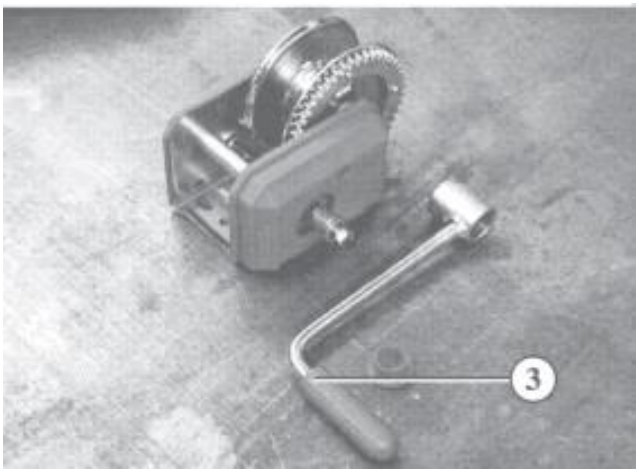
5.3.1 Removing the crank

Types 501 to 901

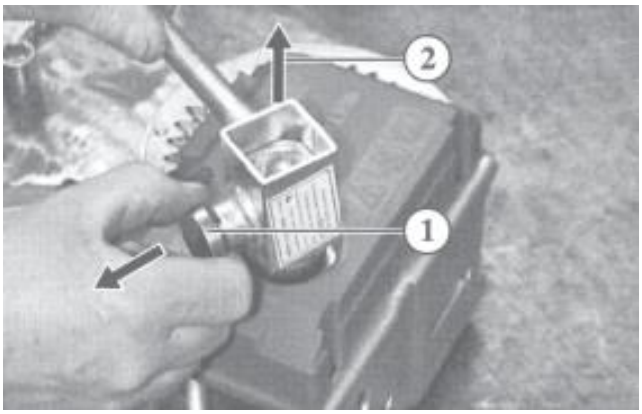
- Remove the cover cap (1)



- Lock the cable drum
- Unscrew the attachment screw (2)
- Remove the retaining ring and washer



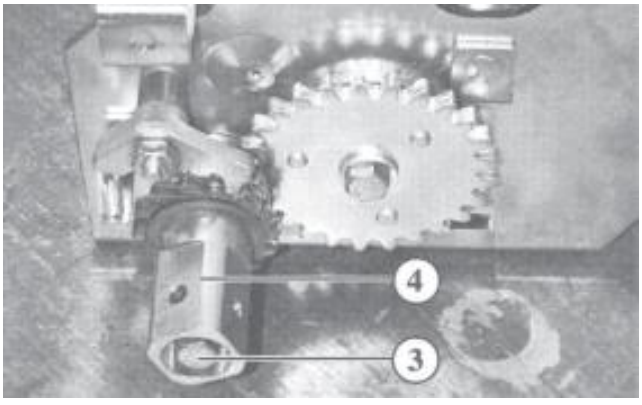
- Loosen and take off the crank handle (3) by turning to the left several times



Types 901 A and 1201 A

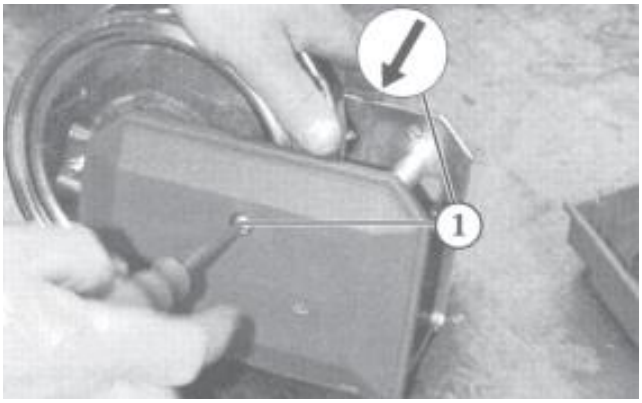
Removing the crank handle

- Pull out the locking button (1)
- Pull the crank handle off the crank nut (2)



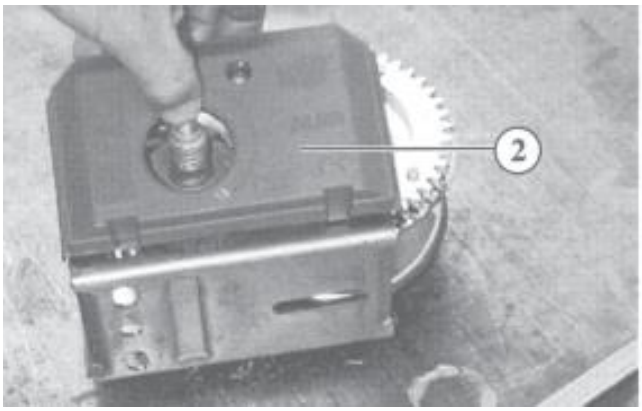
Removing the crank mounting

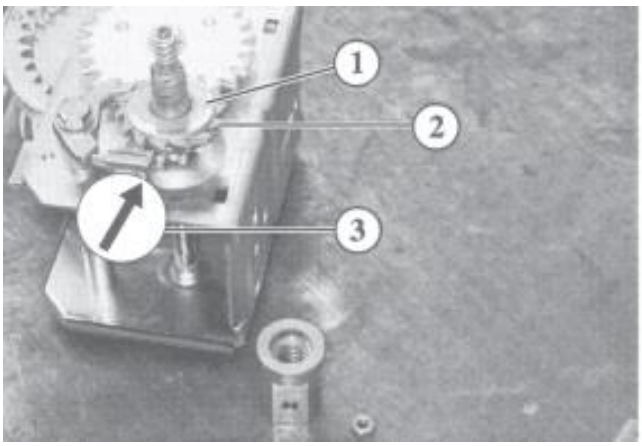
- Lock the cable drum
- Unscrew the attachment screw (3)
- Remove the retaining ring and washer
- Loosen and take off the crank nut (3) by turning to the left several times



5.3.2 Removing the covers

- Remove the crank handle
- Unscrew the screws (1)
- Fold the covers (2) on the top outwards and remove





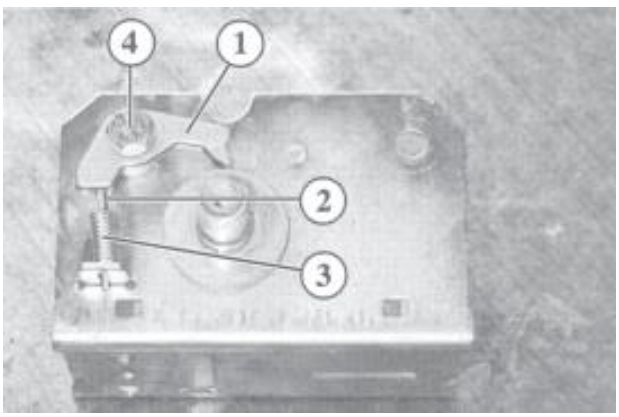
5.3.3 Removing the brake discs and ratchet wheel

- Remove the crank handle
- Remove the covers

Until the pressure spring and the spring retaining plate on the pawl have been unhooked, beware of trapped fingers when removing.

Both brake discs and the ratchet wheel are free to move axially on the drive shaft. They can be removed without tools.

- Remove the outer brake disc (1)
- Remove the ratchet wheel (2)
- Remove the inner brake disc (3)



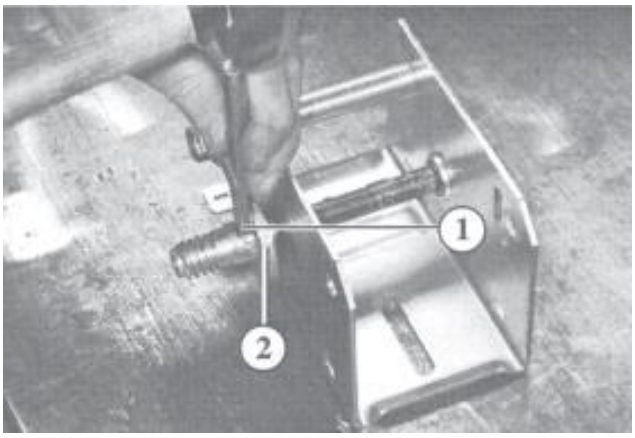
5.3.4 Removing the pawl

- Remove the brake discs and ratchet wheel
- Turn the pawl (1) to the right
- Press the spring retaining plate (2) down wards
- Unhook the spring retaining plate with spring (3)
- Unscrew the hexagon screw (4)
- Remove the pawl

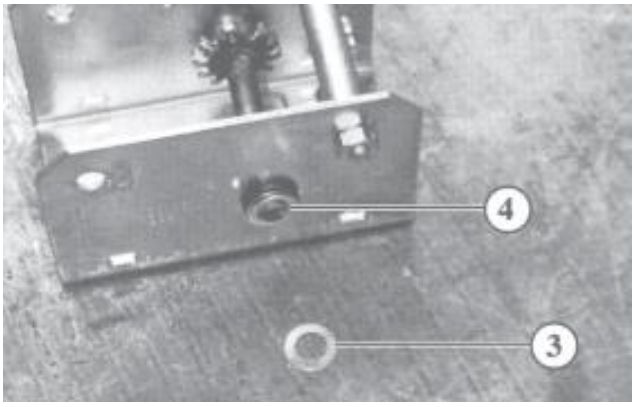
5.3.5 Removing the drive shaft

On type 351, the drive shaft cannot be removed. Accordingly, removal is described for type 501 only.

Type 501

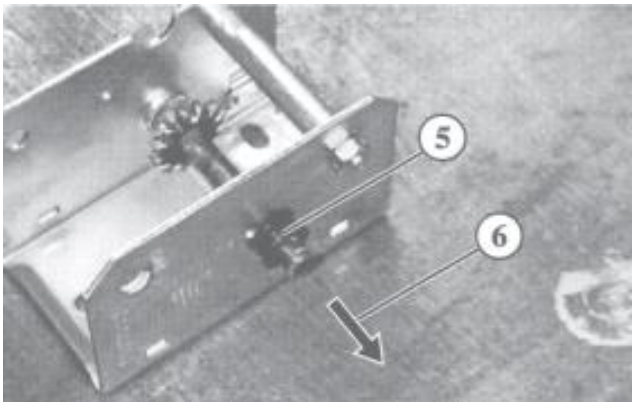


- Remove the brake discs and ratchet wheel
- Remove the pawl
- Drive the pin (1) out of the drive shaft
- Remove the crank mounting (2) from the drive shaft.

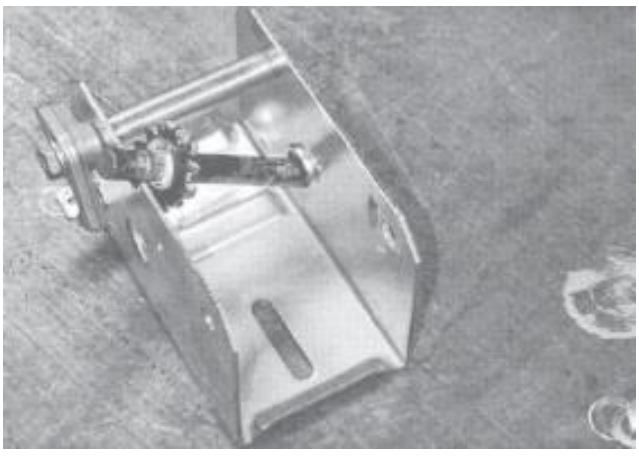


- Remove the retaining ring (3) from the drive shaft
- Remove the washers (4) from the drive shaft

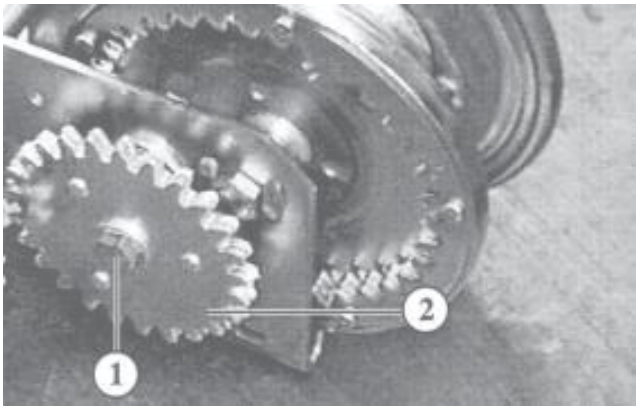
The washers are used for lengthwise adjustment and the same number must therefore be refitted.



- Press the bearing bush (5) outwards and remove
- Push the drive shaft inwards (6) out of the bearing on the drive side

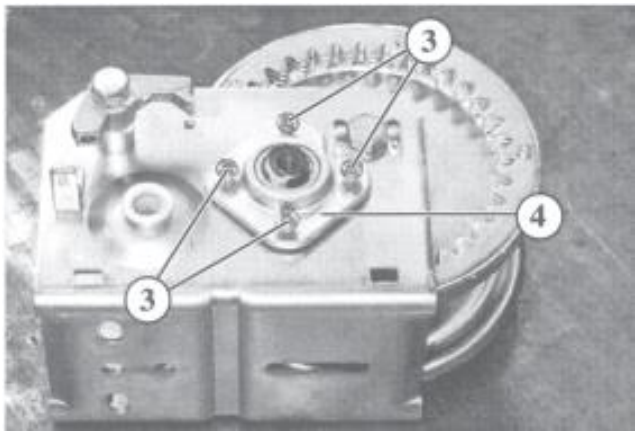


- Take out the drive shaft

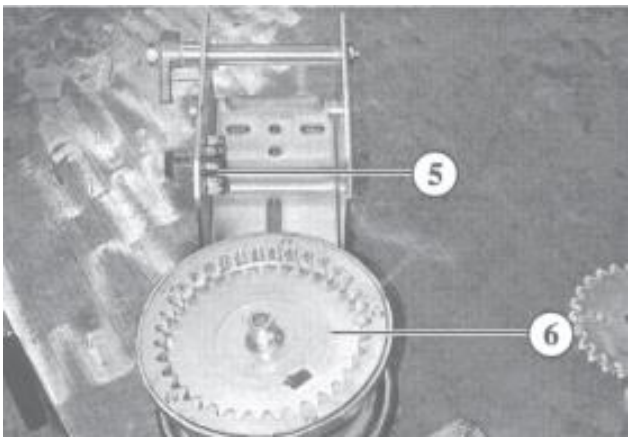


5.3.6 Removing the gear wheel and bearing

- Remove the drive shaft
- Unscrew the hexagon screw (1)
- Take off the gear wheel (2)



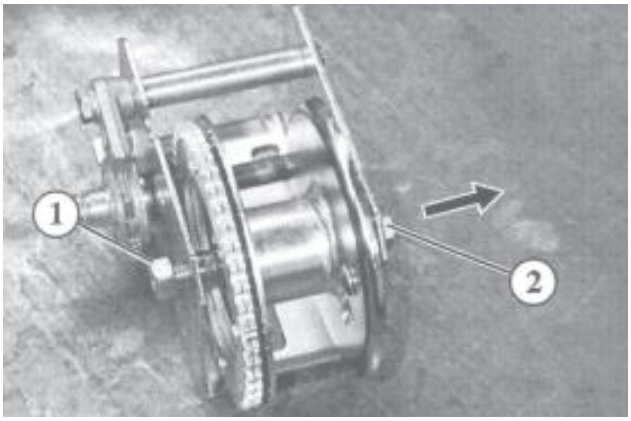
- Unscrew the screws (3)
- Take off the bearing housing (4)



- To remove the intermediate pinion (5), remove the drum (6)

Type 651 to type 901

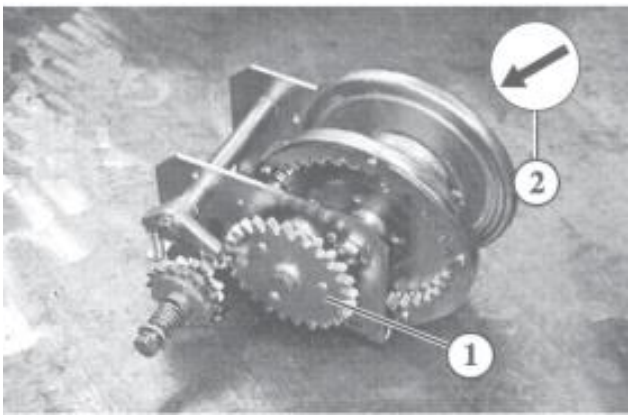
- Remove the gear wheel (1)
- Unscrew the nut (2) on the back of the housing frame



5.3.7 Removing the drum

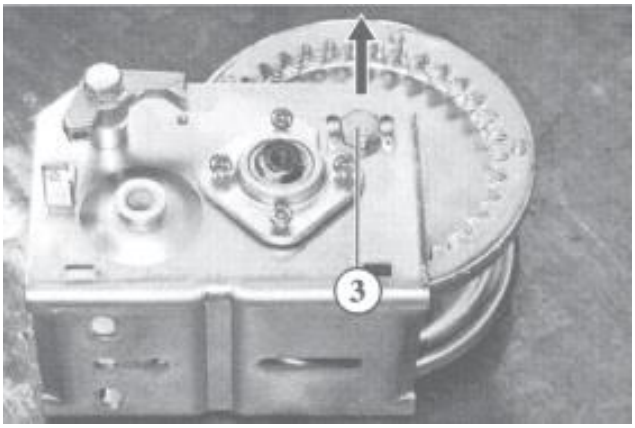
Type 501

- Unscrew the nut (1)
- Take out the screw (2)
- Take out the drum

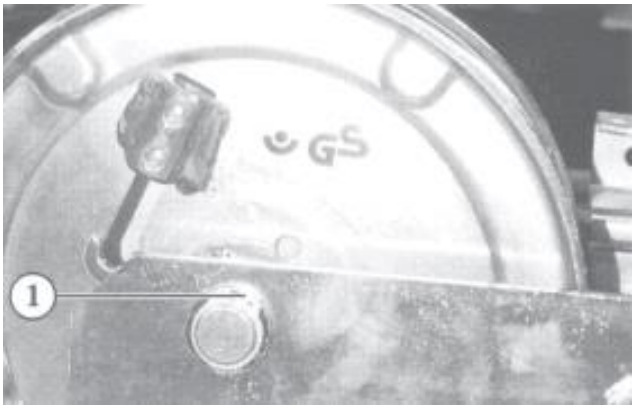


Type 651 to type 901

- Remove the gear wheel (1)
- Unscrew the nut (2) on the back of the housing frame

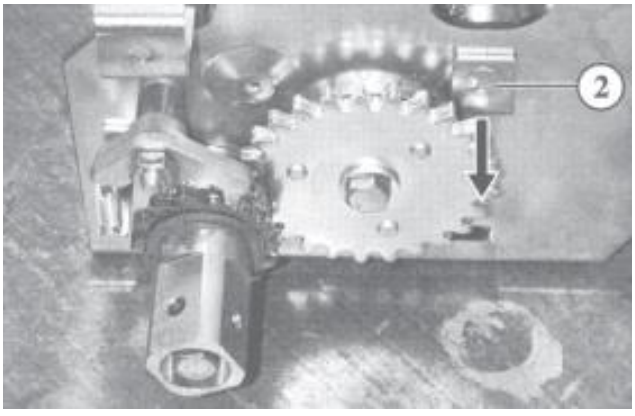


- Pull out the screw (3)
- Take out the drum



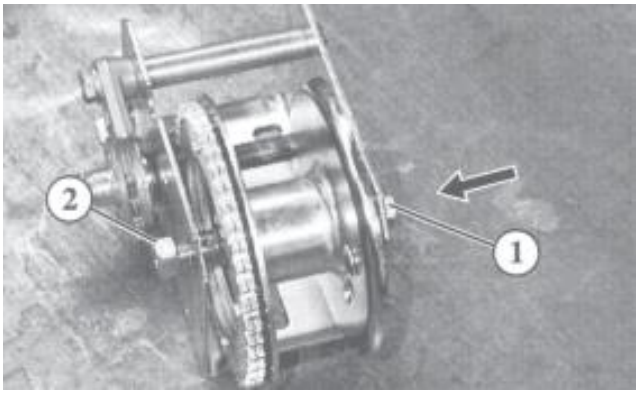
Type 1201

- Remove the gear wheel
- Remove the retaining ring (1) from the drum shaft



- Pull out the axle (2)
- Take out the drum

Contrary to the illustration, the axle can only be taken out with the gear wheel removed.



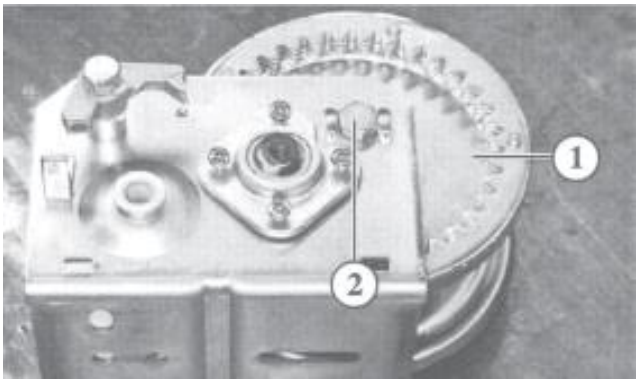
5.3.8 Installing the drum

Type 501

- Insert the screw (1) in the direction of the arrow into the drum and housing
- Tighten the nut (2)

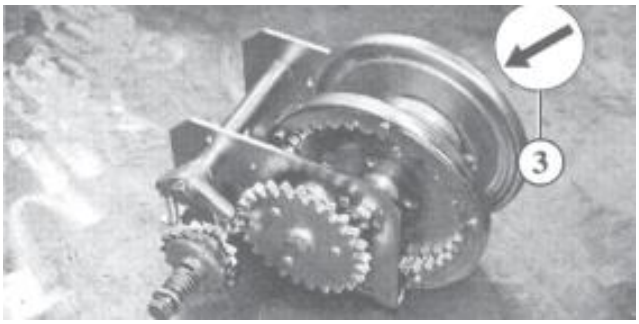
The drum must rotate freely.

Do not re-use self-locking nuts.



Type 651 to type 901

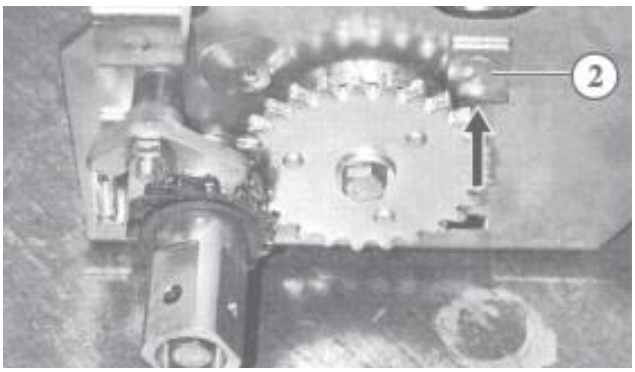
- Insert the drum (1), ensuring that it meshes with the inner intermediate pinion
- Insert the screw (2) into the drum and the frame of the unit



- Tighten the nut (3) on the back of the housing frame

The drum must rotate freely.

Do not re-use self-locking nuts.

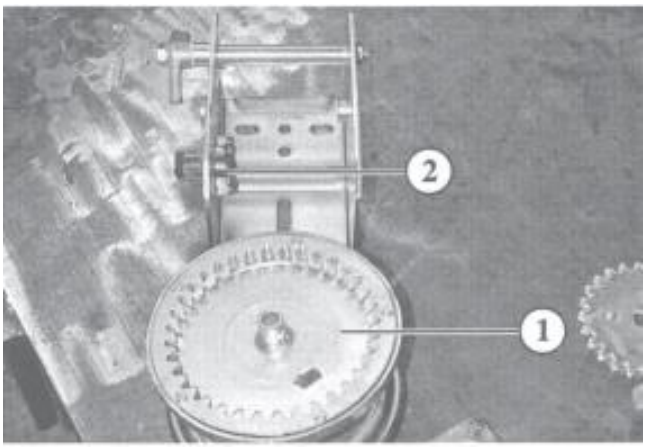


Type 1201

- Insert the drum (1), ensuring that it meshes with the inner intermediate pinion
- Insert the axle (2) into the drum and the housing

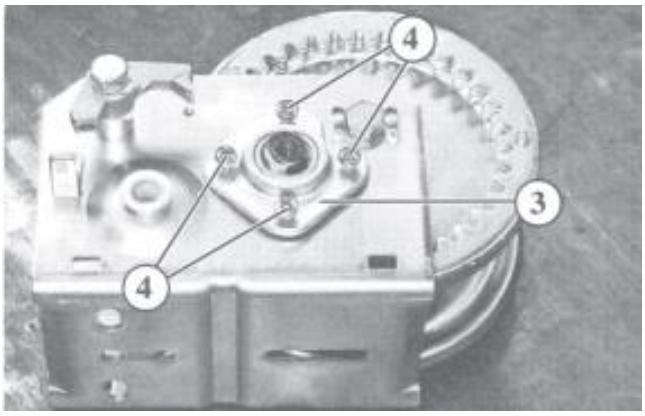
Contrary to the illustration, the axle can only be fitted with the gear wheel re moved.

- Fit the retaining ring (3) onto the drum axle

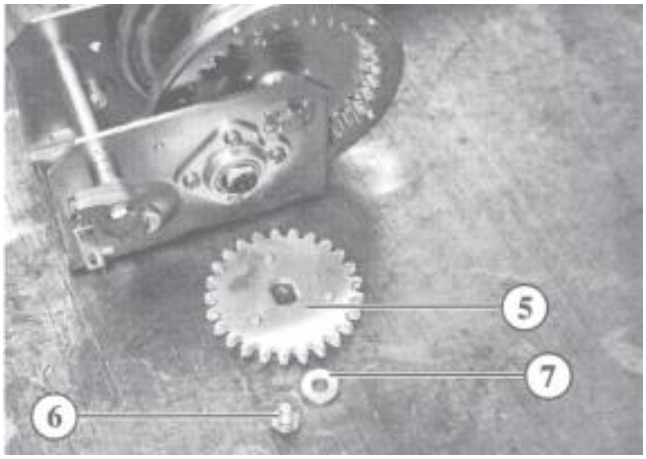


5.3.9 Installing the intermediate pinion and bearing

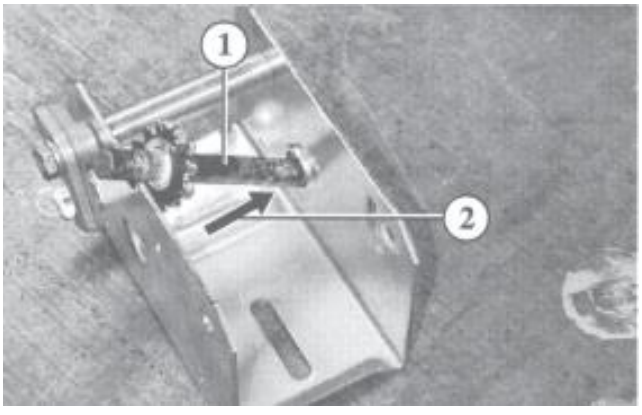
- Install the drum (1)
- Insert the intermediate pinion (2)



- Position the bearing housing (3)
- Tighten the screws (4)



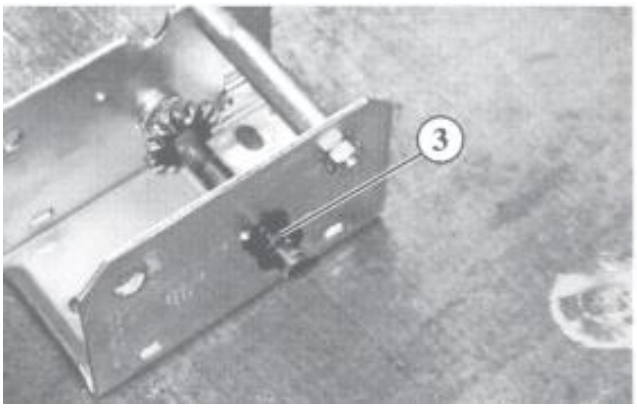
- Fit the gear wheel (5)
- Tighten the screw (6) and washer (7)



5.3.10 Installing the drive shaft

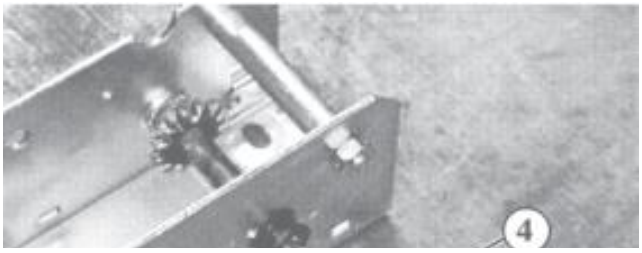
Type 501

- Position the drive shaft (1) at an angle
- Insert the free end into the bearing opening as shown (2)

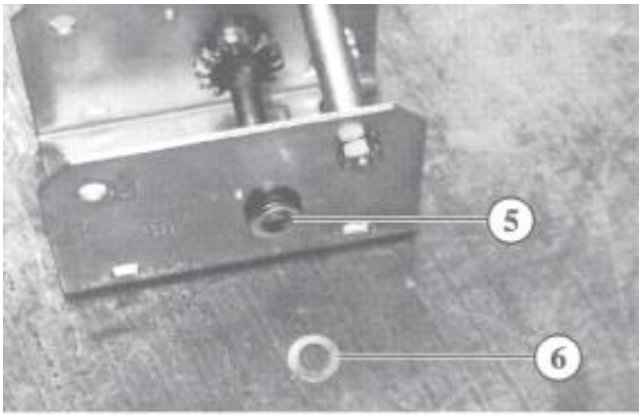


- Fit the bush (3) onto the drive shaft and press into the housing

- Push the drive shaft and bush into the

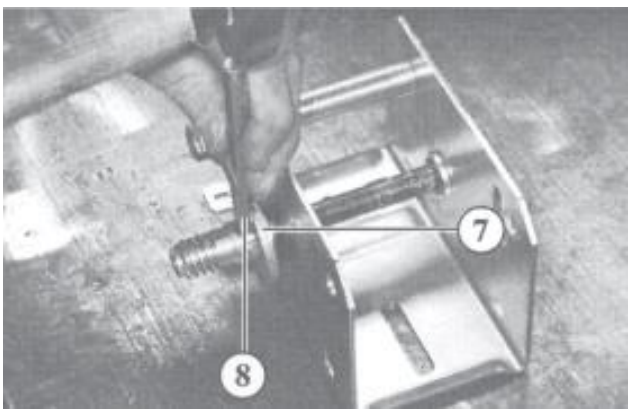


bearing on the drive side (4)

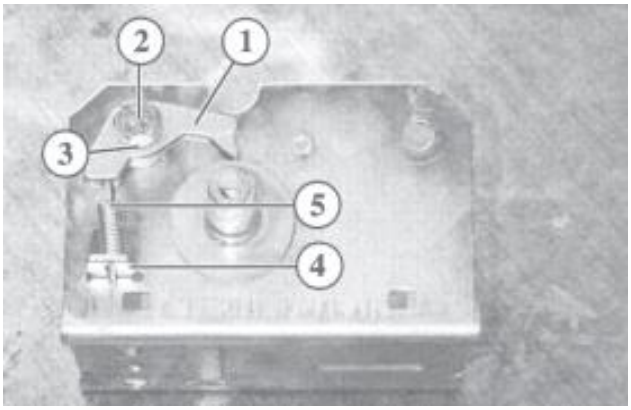


The washers are used for lengthwise adjustment and the same number must therefore be refitted.

- Fit the washers onto the drive shaft
- Fit the retaining ring (6) to the drive shaft



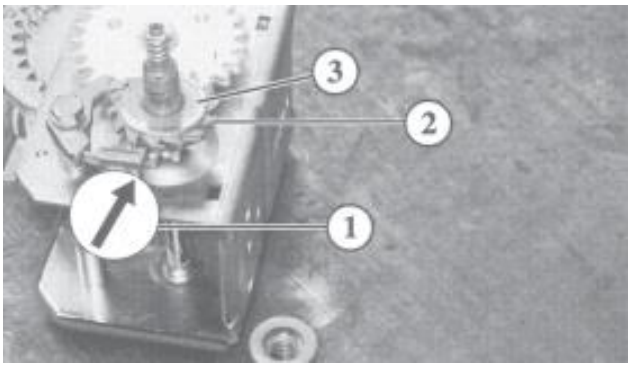
- Fit the crank mounting (7) onto the drive shaft
- Drive a new pin (8) into the drive shaft



5.3.11Installing the pawl

- Place the pawl (1) onto the spacer tube
- Screw on the hexagon screw (2) and washer (3)
- Turn the pawl to the right
- Insert the spring retaining plate (4) and spring (5) into the retainer on the housing
- Hook the spring retaining plate and pres sure spring into the pawl

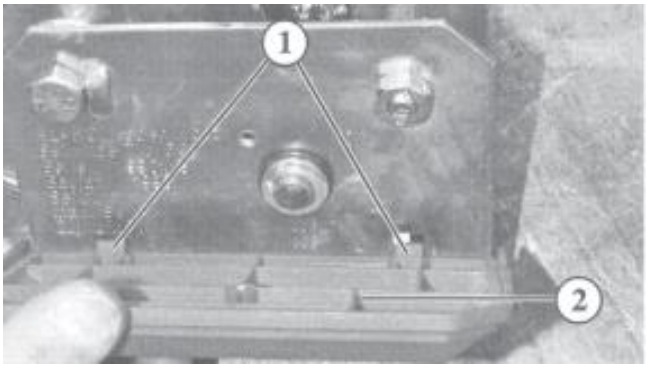
5.3.12 Installing the brake discs and ratchet wheel



If the pressure spring on the pawl is not unhooked, beware of trapped fingers when installing.

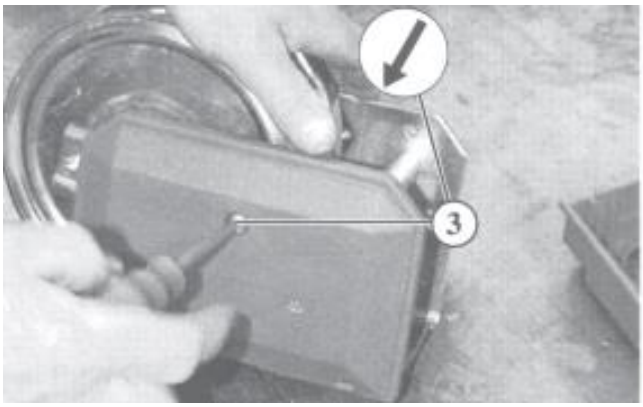
On types 351 to 901, the brake disks should be lubricated with graphite paste (Wolfracoate 99113). On type 1201, they are not metal and must therefore not come into contact with oil or grease.

Both brake discs and the ratchet wheel are free to move axially on the drive shaft. They can be fitted without tools.



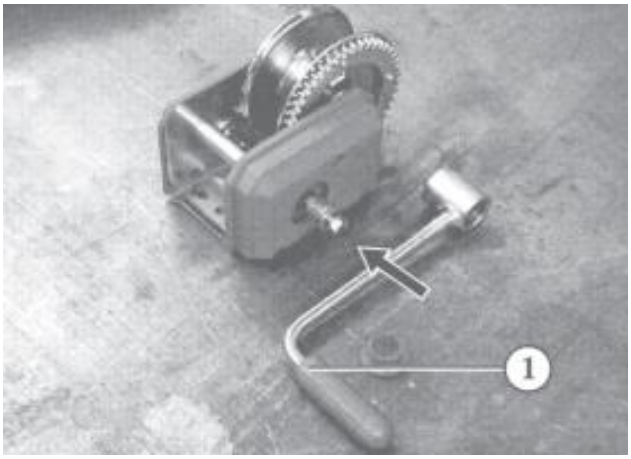
- Fit the inner brake disc (1)
- Fit the ratchet wheel (2)
- Fit the outer brake disc (3)

5.3.13 Fitting the covers



- Insert plastic lugs (1) on the covers (2) into the winch housing
- Fit the covers

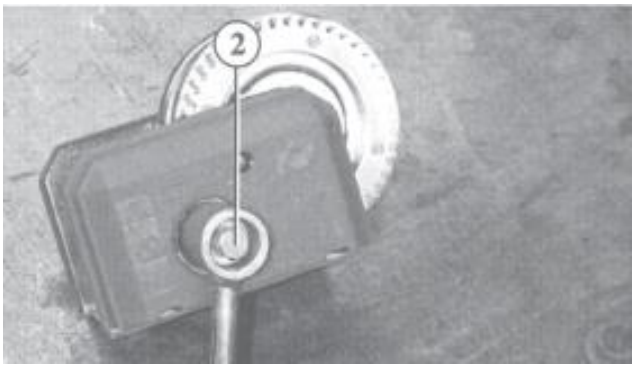
- Tighten the screws (3)



5.3.14 Installing the crank handle

Type 501 to type 901

- Fit the crank handle (1) onto the drive shaft, having previously removed the screw, washer and retaining ring
- Screw the crank handle onto the drive shaft, until the crank nut bears against the brake disc

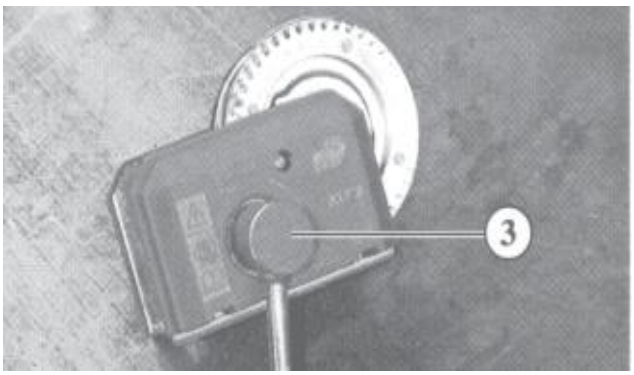


- Lock the cable drum
- Fit the washer
- Fit the retaining ring
- Tighten the attachment screw (2)

Note maximum torque values:

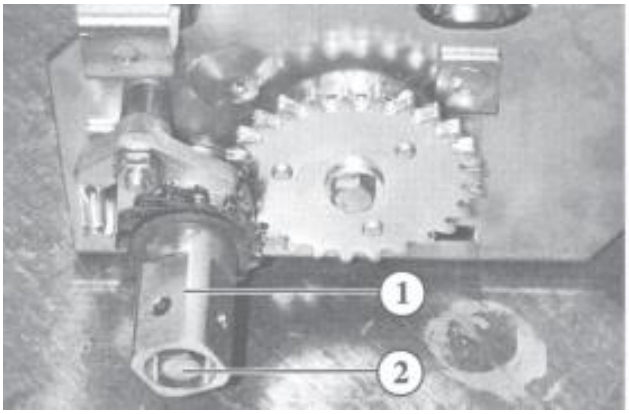
- type 351: 10 Nm
- types 501 - 901: 20 Nm
- type 901 A: 10 Nm
- type 1201 A: 20 Nm

The crank must turn at least a quarter of a turn to the left without the drive shaft or cable drum moving or turning with it.



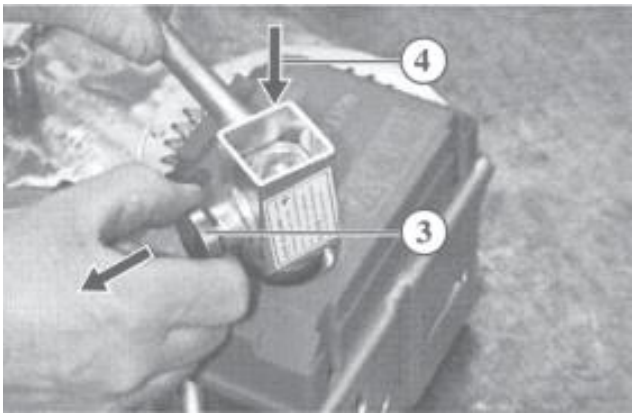
- Press on the cover cap (3)

Types 901 A and 1201 A



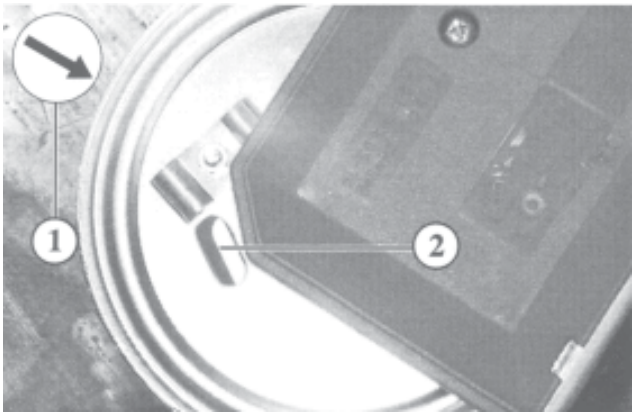
Fitting the crank nut

- Place the pressure spring in the crank nut
- Screw the crank nut onto the drive shaft until the crank nut bears against the brake disc
- Lock the cable drum
- On type 1201 A, insert the attachment screw (2) and tighten
- On type 901 A, fit a new self-locking hexagon nut onto the threaded section of the drive shaft



Fitting the crank handle

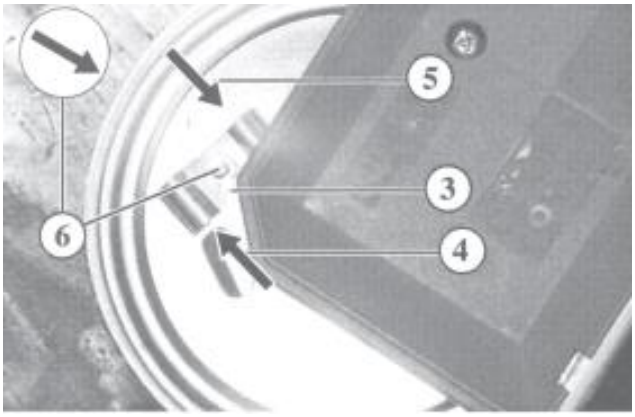
- Pull out the locking button (3)
- Fit the crank handle onto the crank nut (4)
- Engage the locking button



5.3.15 Replacing cables and straps

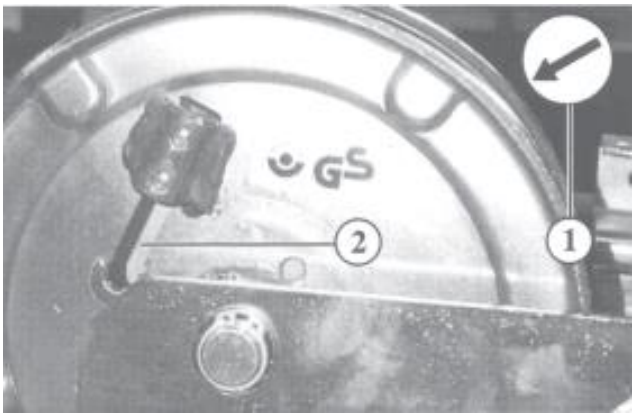
Installing the cable on types 501 to 901

- Thread the cable end from the inside (1) of the drum outwards through the opening (2)



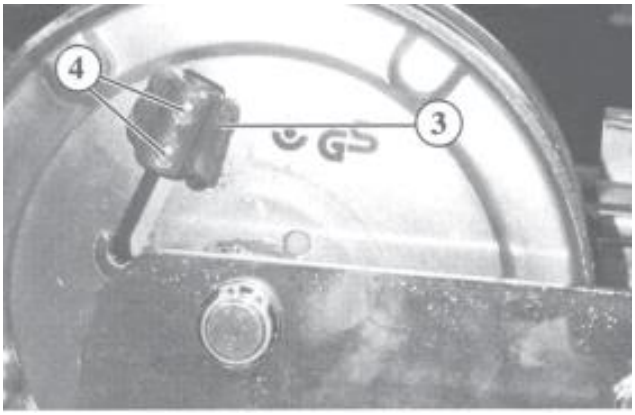
- Pass (4) the cable end out of the opening and under the retaining plate (3)
- Bring the cable end back to the other side of the retaining plate (5) so that a semi-circular loop is formed
- Tighten the screw (6)

Note: maximum torque 10 Nm.



Installing the cable on type 1201

- Thread the cable end from the inside (1) of the drum outwards through the opening (2)



- Pass the cable end out of the opening and through the sleeve (3)
- Tighten the screws (4) on the outside of the sleeve

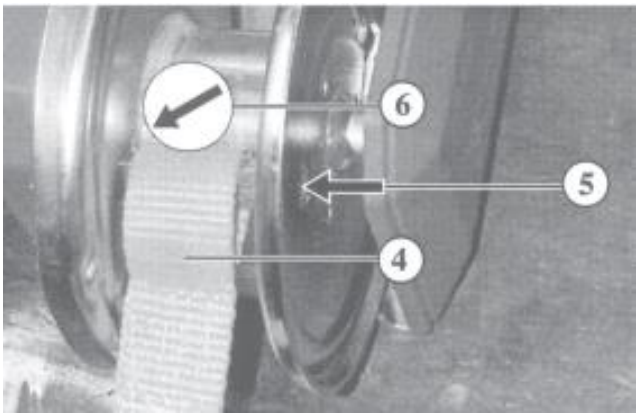
Installing the strap on types 501 to 901

The anchor bar (1) includes a washer (2) and screw (3).

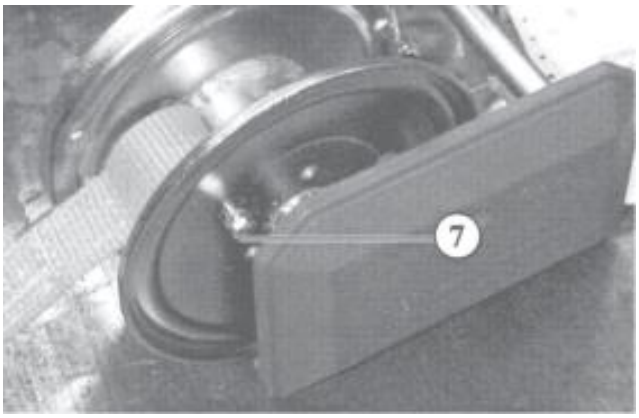
The various small and medium size models each require different anchor bars and strap sizes.

The breaking strain of the strap must be at least seven times the specified haul ing load in the lowermost layer of cable.

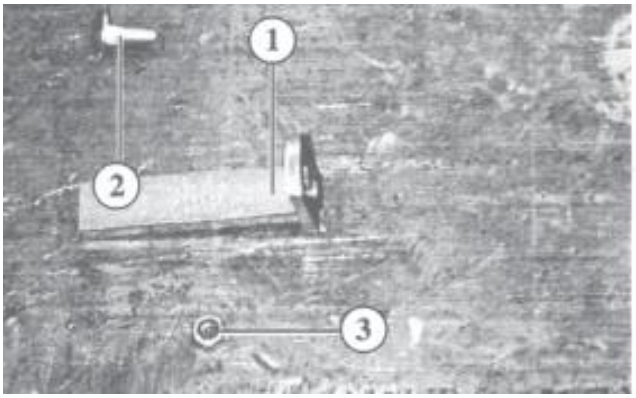
Type	Anchor bar	Strap	Minimum breaking strain
351	352.516	245.355	2450 kg
501	352.514	245.356	3500 kg
651	352.515	245.357	4550 kg
901	352.516	245.358	6300 kg
1201	352.657	245.115	8750 kg



- Pass (5) the anchor bar from the outside of the drum through the strap loop (4)
- Engage the anchor bar on the opposite side (6)



- Insert and tighten the screw complete with washer (7) through the outside of the drum into the threaded hole in the anchor bar

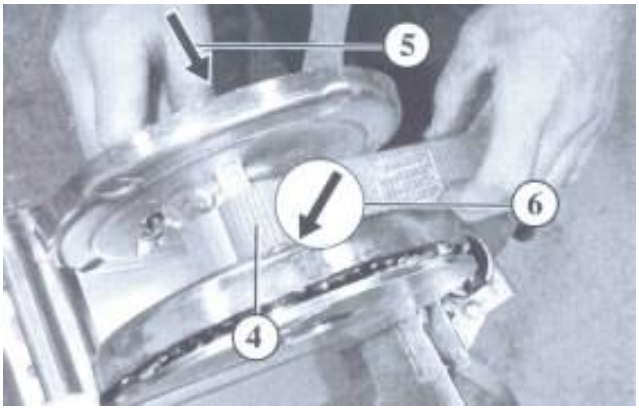


Installing the strap on type 1201

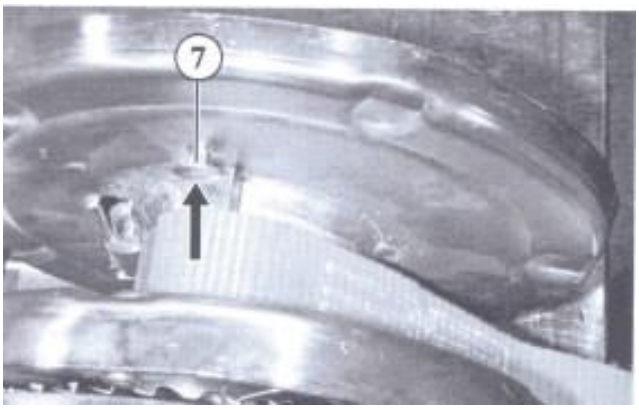
- The anchor bar (1) includes the carriage bolt (2) and self-locking nut (3)

The breaking strain of the strap must be at least seven times the specified haul ing load in the lowermost layer of cable.

Type	Anchor bar	Strap	Minimum breaking strain
351	352.516	245.355	2450 kg
501	352.514	245.356	3500 kg
651	352.515	245.357	4550 kg
901	352.516	245.358	6300 kg
1201	352.657	245.115	8750 kg



- Pass (5) the anchor bar from the outside of the drum through the strap loop (4)
- Engage the anchor bar on the opposite side (6)



- From the inside of the drum, insert the carriage bolt (7) into the square opening in the anchor bar