

# Clutches and brakes for machine tools

Petr Zelený – Production machines I

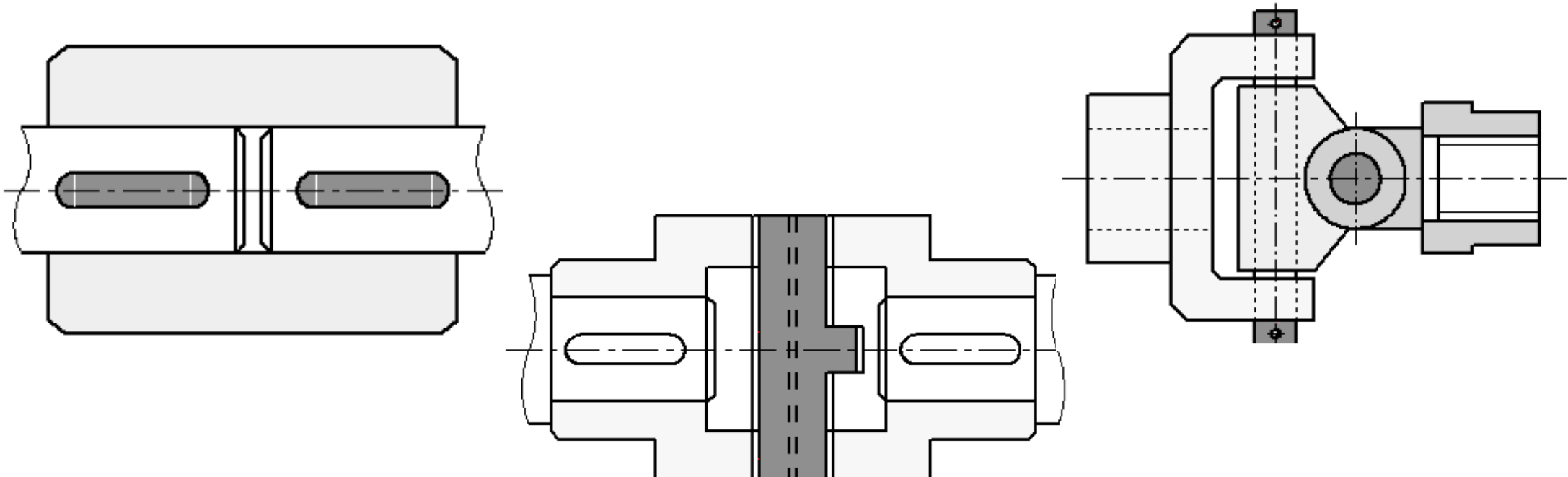
14.04.2014

# Clutches and brakes for machine tools

- **The types of clutches used in machine tools,**
- **Samples of clutches,**
- **Applying the brakes for machine tools,**
- **Samples of brakes.**

# Clutches for machine tools

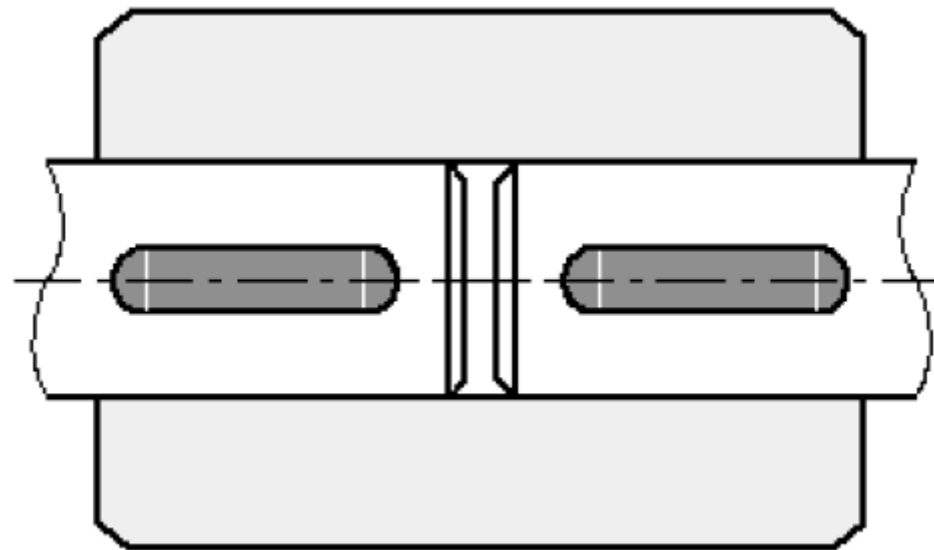
Features is to allow the clutch transmitting torque between two rotating parts - shaft. Their complementary function is to dampen torsion vibrations, allow disconnection a sizeable parts, assembly and disassembly, eliminate inaccuracies caused by manufacturing and operating.



# Clutches for machine tools

- **Fixed clutches** - used for permanent connection to coaxial shafts.

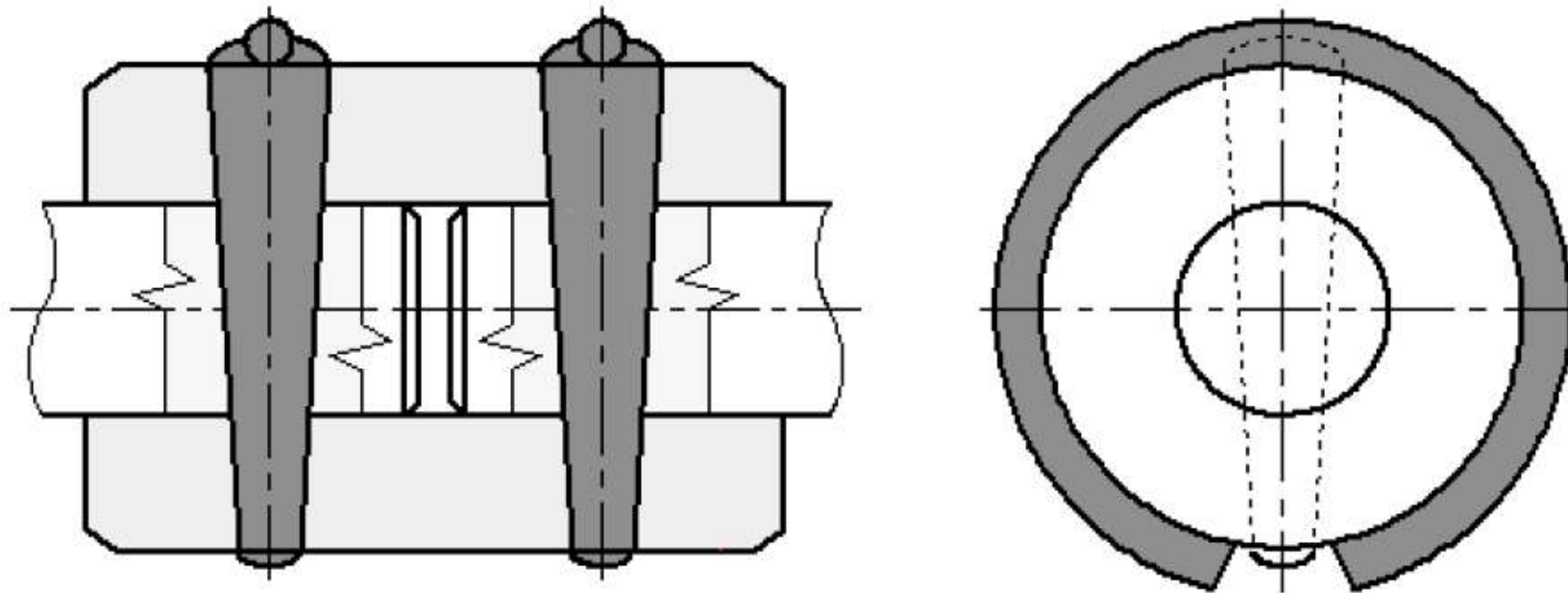
## Fixed sleeve clutch



# Clutches for machine tools

- **Fixed clutches** - used for permanent connection to coaxial shafts.

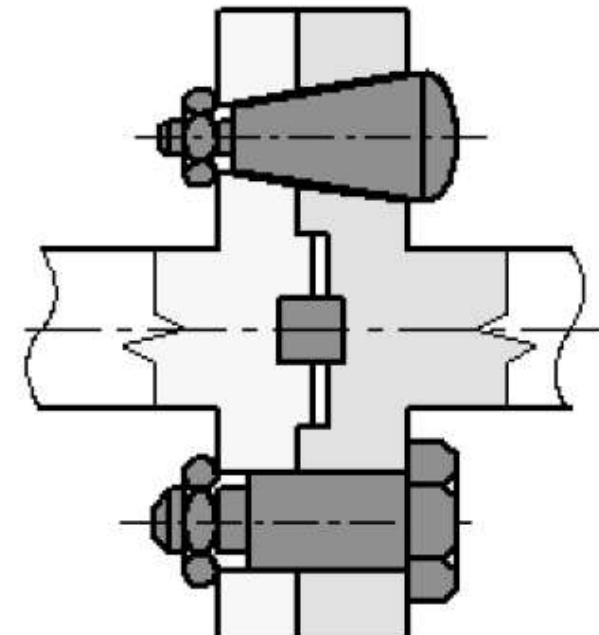
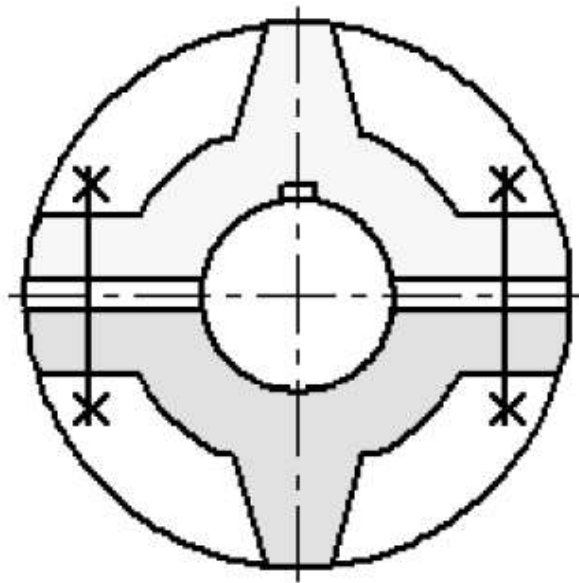
Fixed sleeve clutch with pin



# Clutches for machine tools

- **Fixed clutches** - used for permanent connection to coaxial shafts.

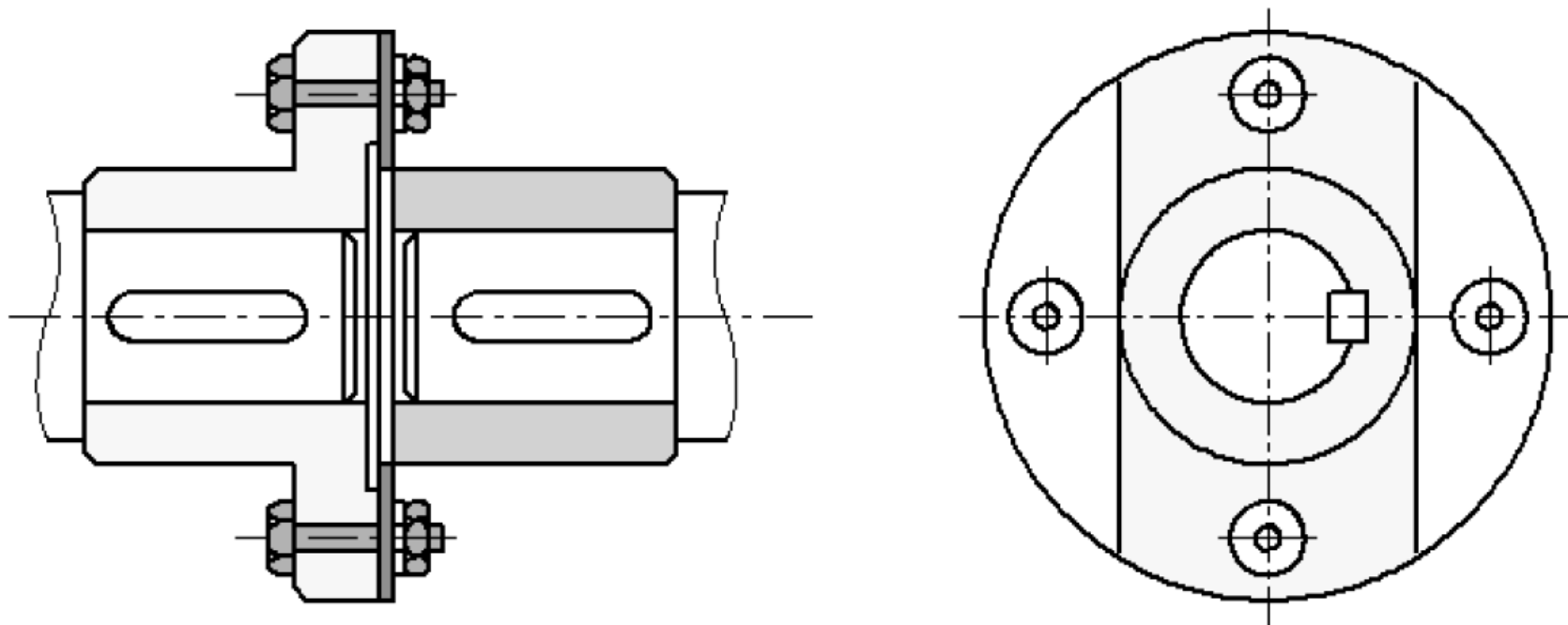
## Fixed-disc clutch



# Clutches for machine tools

- **Flexible clutches** - flexible components help to balance inaccuracies and have a damping effect.

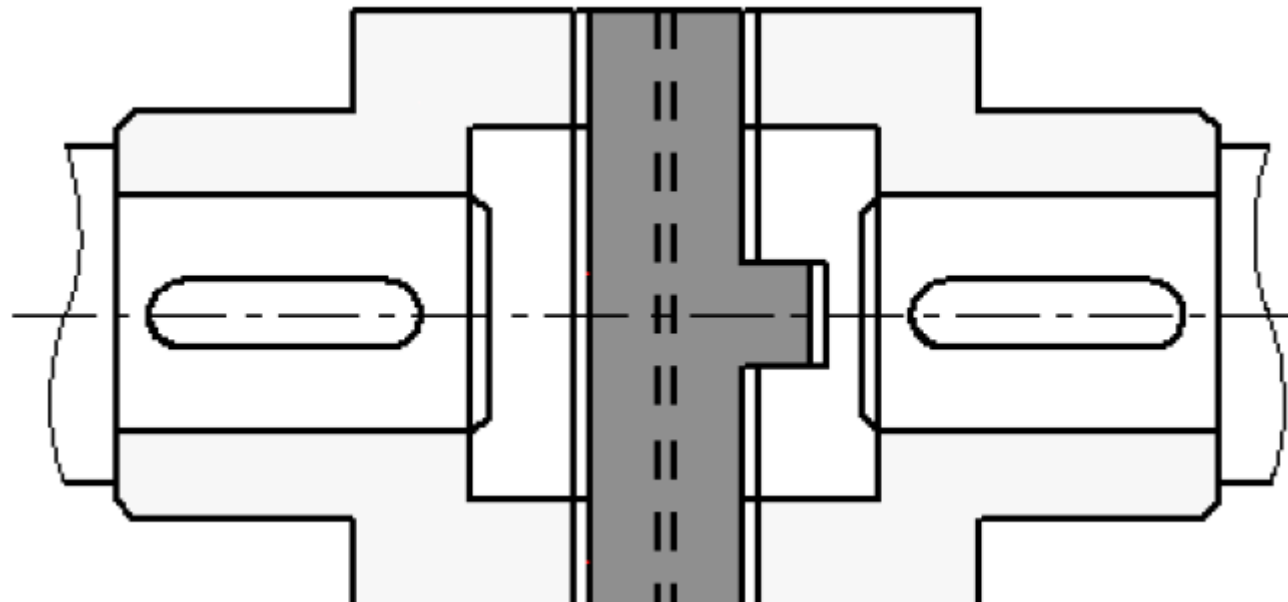
Flexible disc clutch



# Clutches for machine tools

- **Flexible clutches** - flexible components help to balance inaccuracies and have a damping effect.

Flexible cross clutch

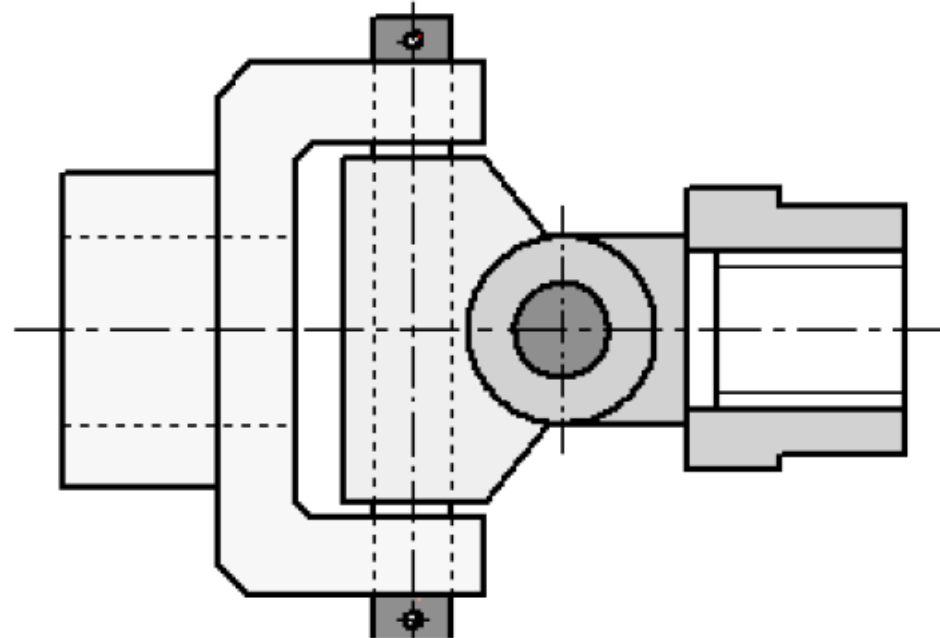




# Clutches for machine tools

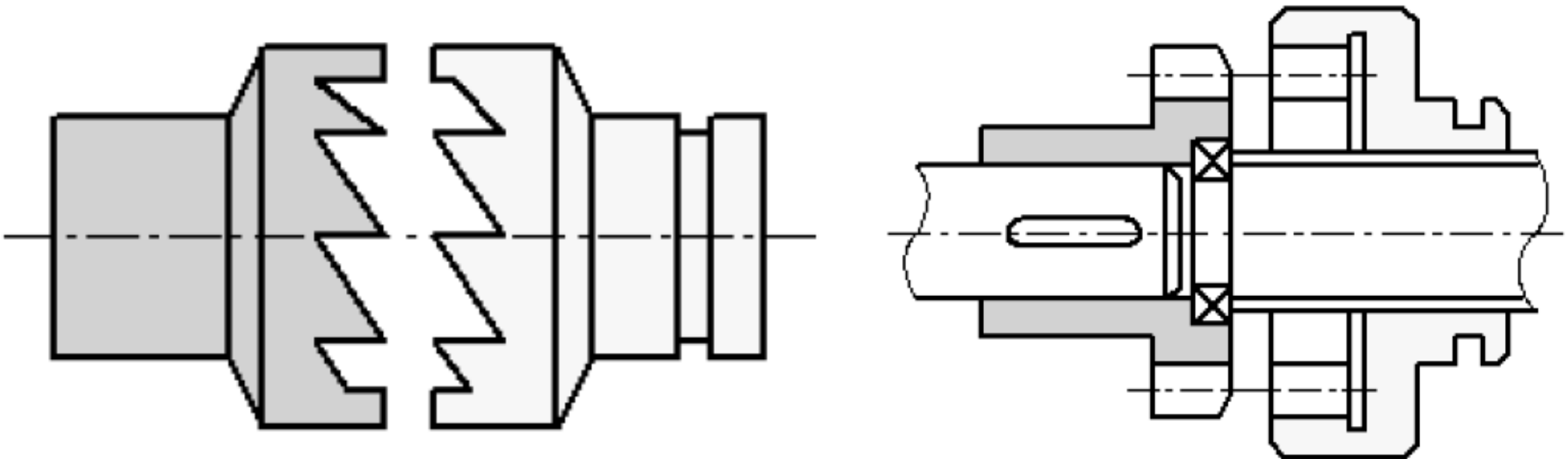
- **Flexible clutches** - flexible components help to balance inaccuracies and have a damping effect.

Flexible articulated clutch



# Clutches for machine tools

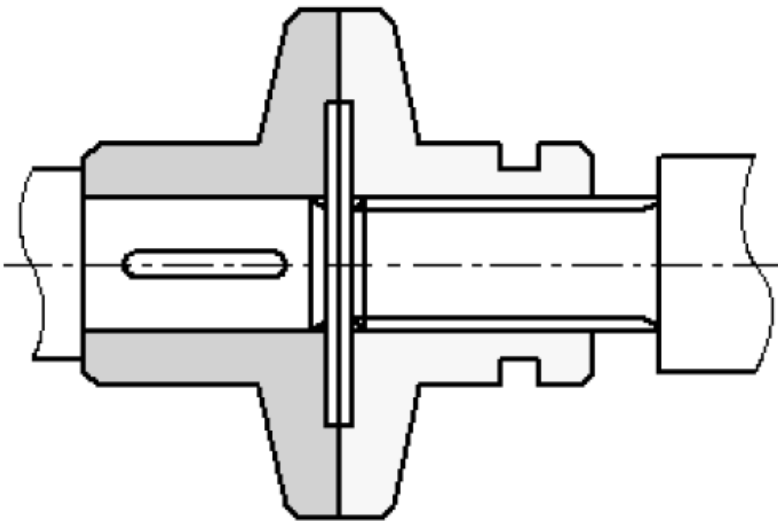
- **Sliding clutches** - allow connection and disconnection of shafts at rest and during rotation. Controlled mechanically, hydraulically, electrically.
- **Gear clutches (front, peripheral)** - used for high moments. Inserting arises shock. For dimensioning these couplings is necessary to check the teeth to bend and deformation.



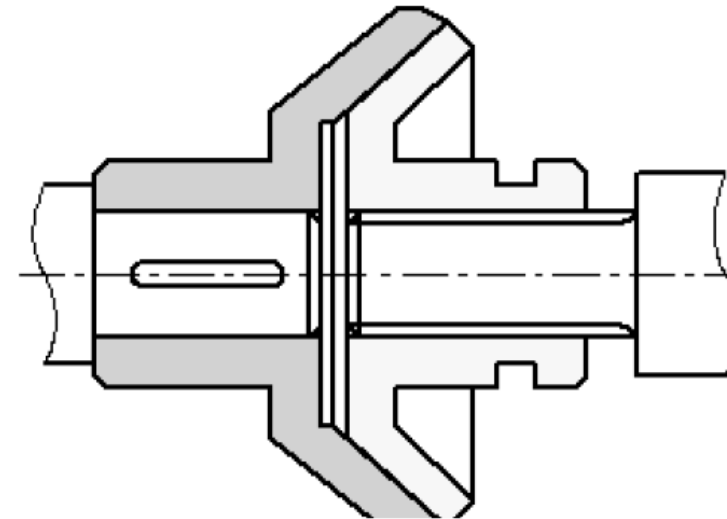
# Clutches for machine tools

- **Sliding clutches** - allow connection and disconnection of shafts at rest and during rotation. Controlled mechanically, hydraulically, electrically.
- **Friction clutches** - their use is mainly for high torques, the use is limited by warming, at high loads must be cooled.

## Sliding friction disc clutch

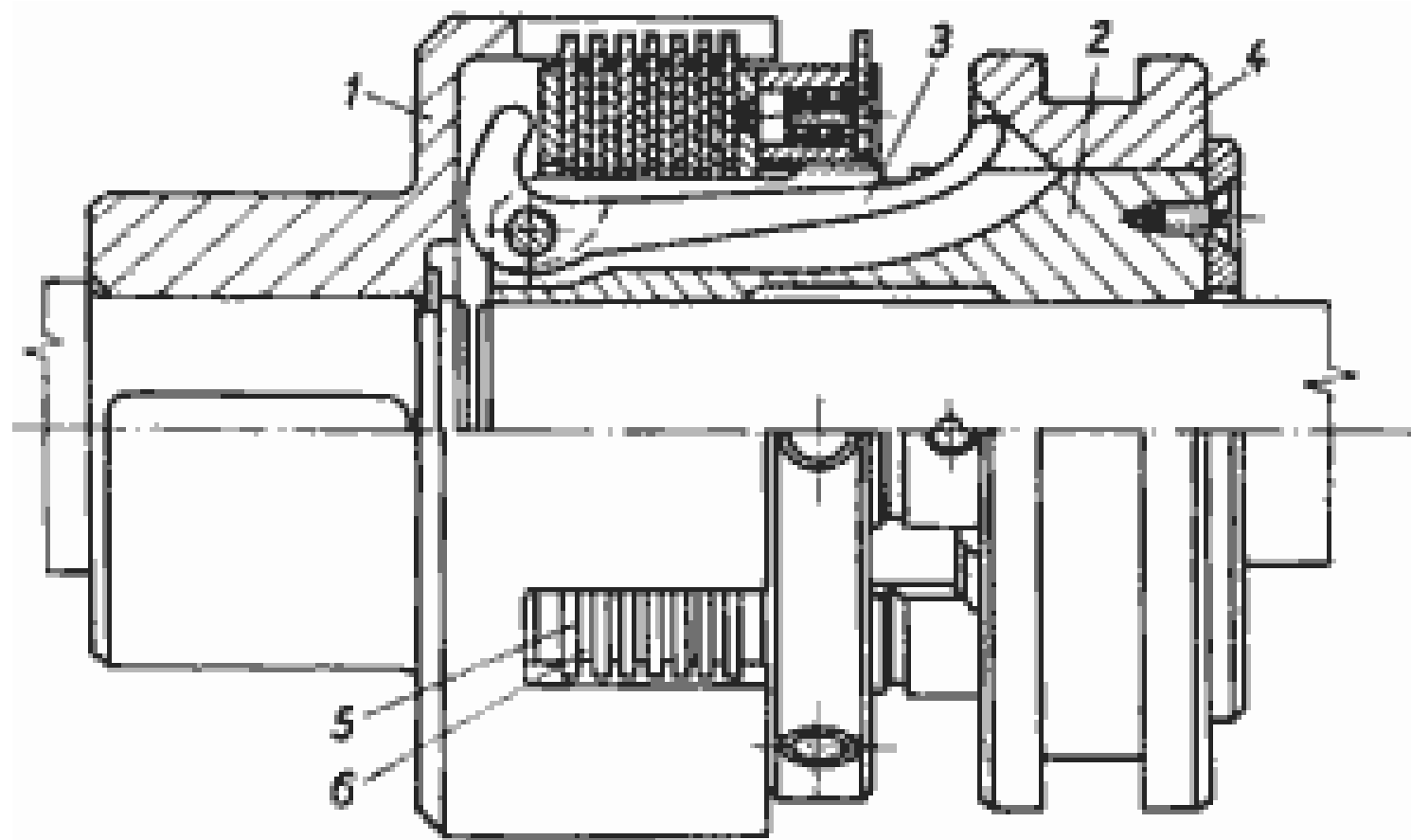


## Sliding friction cone clutch



# Clutches for machine tools

- **Disc, lamellar clutches** – they are electromagnetically controlled.

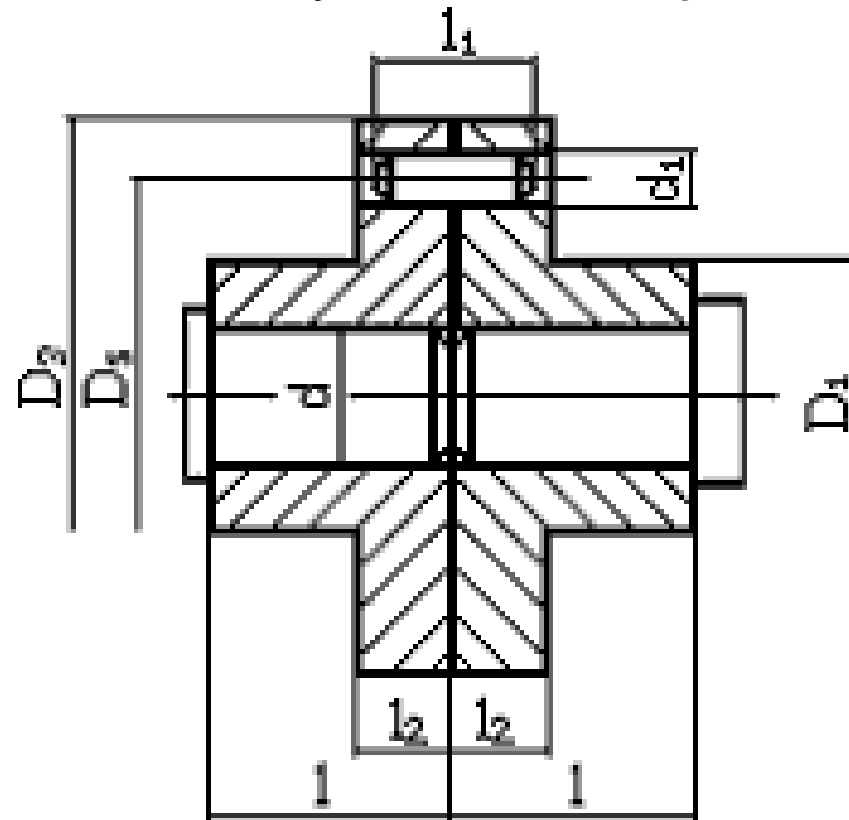


Lamelová spojka

# Clutches for machine tools

- **Safety clutches** - used for protecting the drive mechanism against overload.

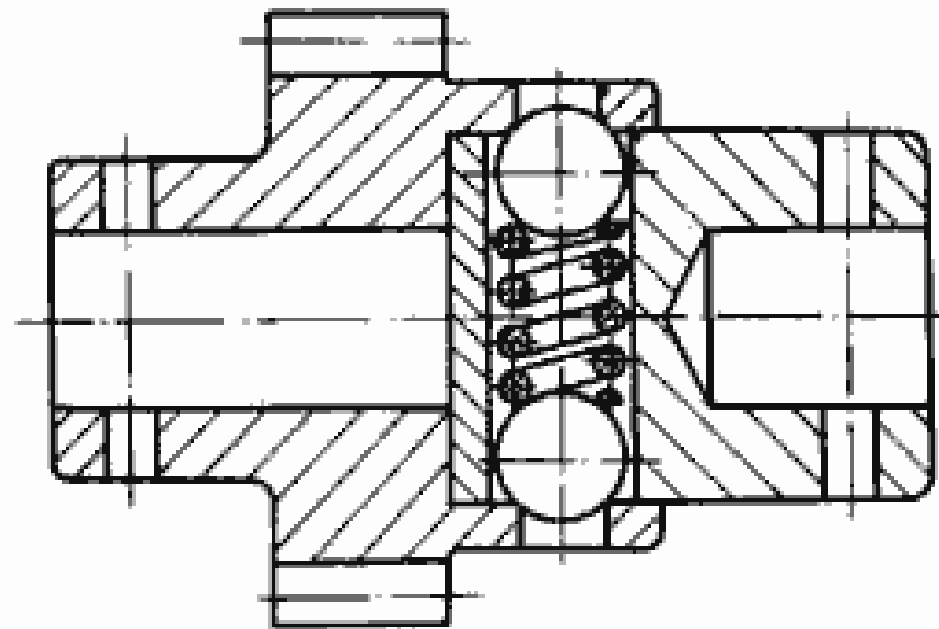
Safety clutch with pin



# Clutches for machine tools

- **Safety clutches** - used for protecting the drive mechanism against overload.

## Safety clutch with balls



Kuličková pojistná spojka

# Brakes for machine tools

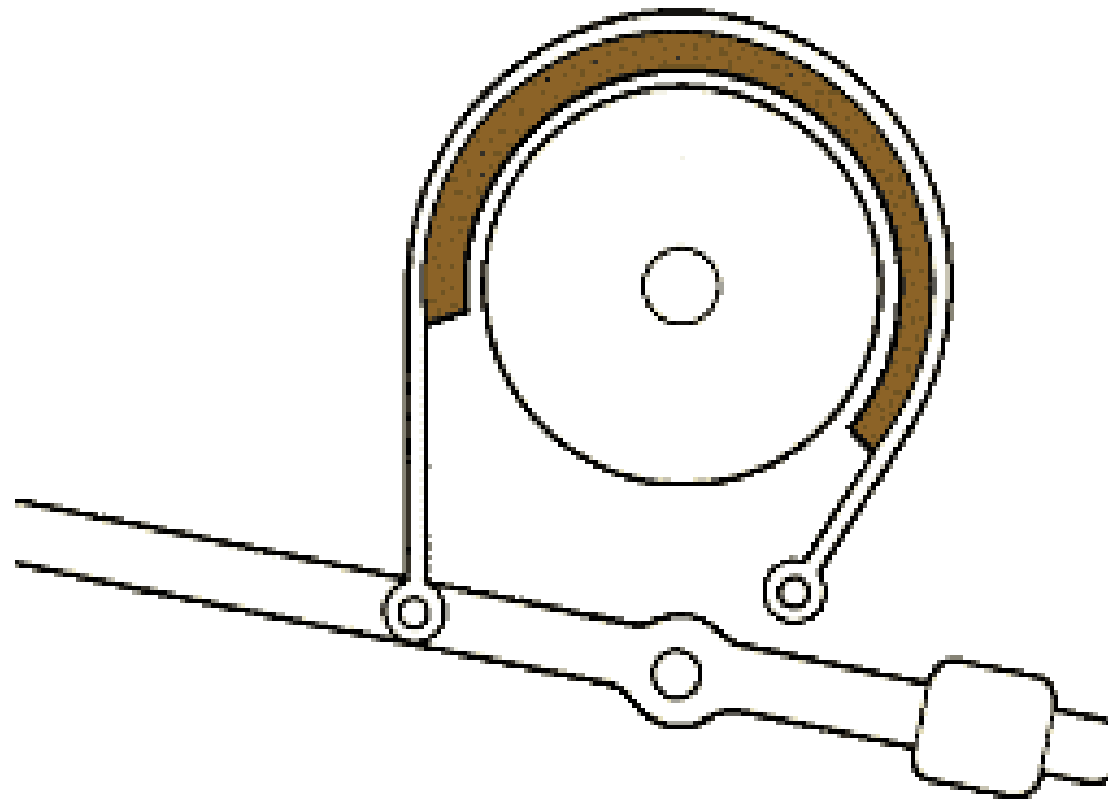
The task of brakes for machine tools is a fast stop of spindle or the transmission system (for exchanging the workpiece, tool, change gear).

Types:

- belt
- jaw
- disc
- lamellar

# Brakes for machine tools

## Belt





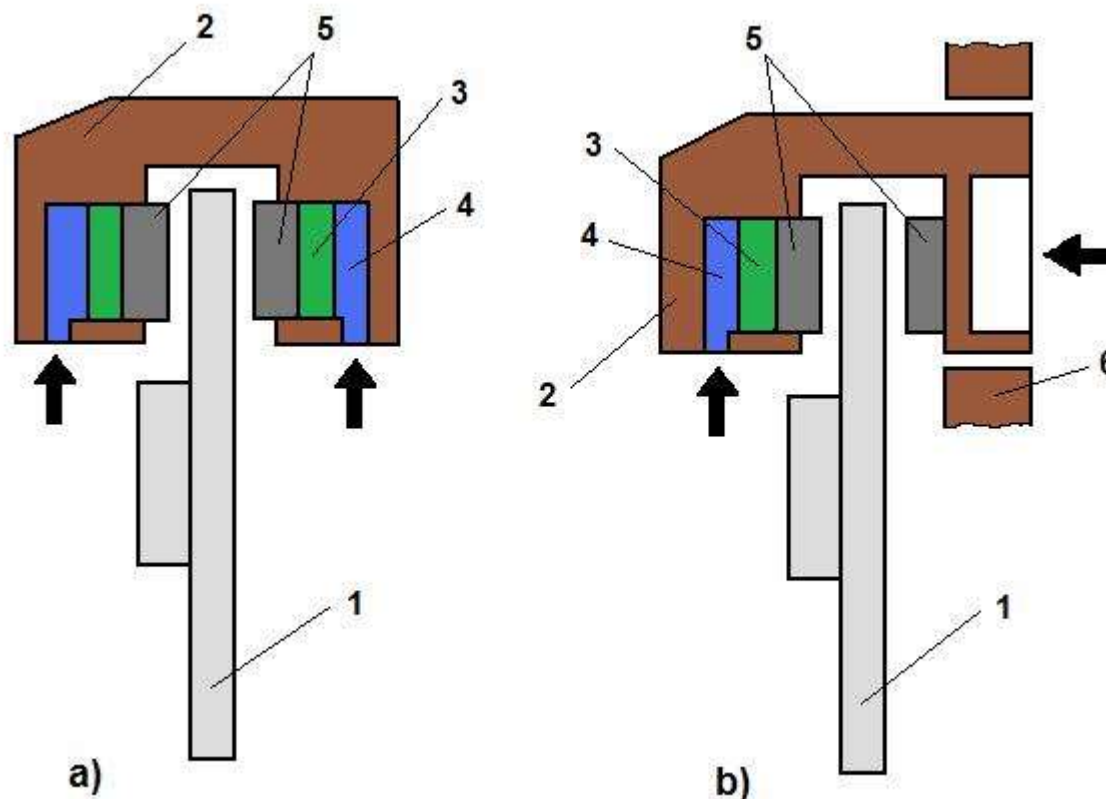
# Brakes for machine tools

## Jaw



# Brakes for machine tools

## Disc



# Brakes for machine tools

## Lamellar



# Literature

Pokorný, P., *Obráběcí stroje*, Skriptum TUL, Liberec 2001

MAREK, J. et al. *Design of CNC Machine Tools*. Praha: MM publishing, 2015, 730 p. ISBN 978-80-260-8637-6.