

**Setting-up and Operating of Regular Engine Lathes – Course:  
Techniques for Machining of Material. Instruction Examples for  
Practical Vocational Training**



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# Setting-up and Operating of Regular Engine Lathes – Course: Techniques for Machining of Material. Instruction Examples for Practical Vocational Training

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## Preface

The present material contains selected practical examples serving the purpose of applying and consolidating the knowledge, skills and abilities in the field of setting-up and operating lead-screw and feed shaft lathes.

The instructions given on the required sequences of operations, tools and auxiliary means form the basis for the systematic preparation of the setting-up and operating of leadscrew and feed shaft lathes. They are meant to make the sequence of operations as efficient as possible.

Previous knowledge is recommended, as this is the precondition for the operations to be carried out.

The previous knowledge should be checked and/or repeated before beginning the work. The given technological sequence of operations guarantees a good acquisition of the abilities to be learned. The sequence of the operations must be observed in order to achieve a good quality.

To the instruction examples 2 and 3, a workshop sketch is attached from which the required shapes and dimensions of the workpiece are to be seen. The necessary explanations of these sketches are placed in front of the technological sequence of operations of these examples.

The regulations on labour safety and fire protection have always to be observed. Hints in this connection are given only in special cases under the category of “Remarks”.

## Instruction example 1.1.: Handling the operation elements

The operation elements of a regular engine lathe shall be actuated and their functions be realized.

### Required previous knowledge

Read the drawing.

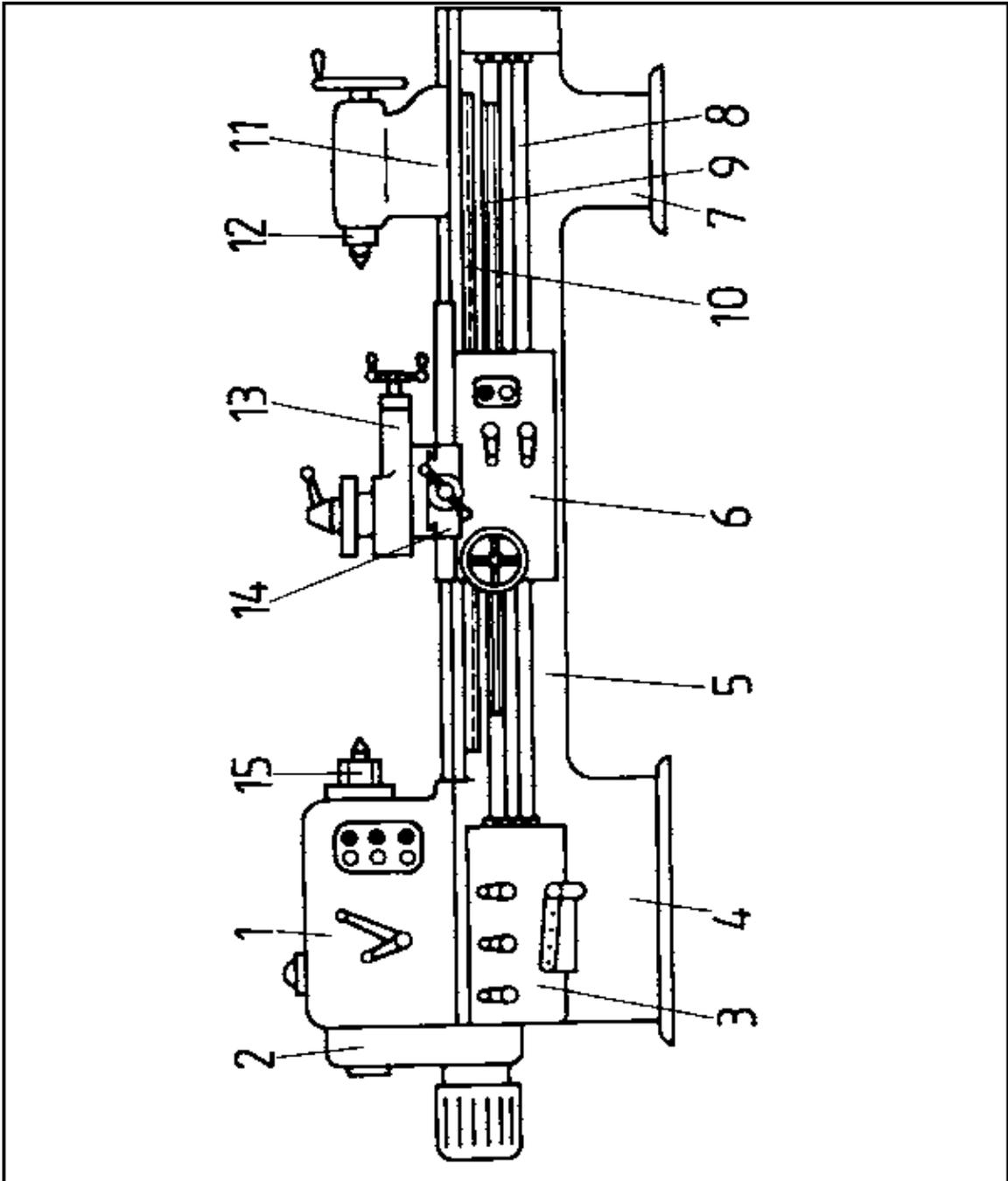
### Sequence of operations

### Remarks

1. Setting the rotational speed

Pay attention to the switching symbols, use existing rotational speed tables. Do switching exercises only with the machine at rest.

- |  |   |
|--|---|
| 2. Setting the feed  | Pay attention to the switching symbols. If required, change interchangeable gears (interchangeable gear calculation). Switch off the main switch before opening the gear box. |
| 3. Setting the tool carrier with apron for cylindrical turning and/or thread cutting | Pay attention to differences in actuating the feed with thread cutting. Use the control shaft with long machines.   |
| 4. Setting the cross slide for surfacing   | Pay attention to the possibilities of manual and automatic feed. Take notice of feed and change of diameter (scale).  |
| 5. Actuating the tool rest   | Only manual feed possible.  |
| 6. Setting the lathe tool holder   | Examine clamping jaw and/or drawbolts.  |
| 7. Actuating the tailstock   | Fixing by tightening the clamping screw. Note adjustability, examine rubbing surfaces as to cleanliness.  |
| 8. Switching on the machine  | Observe safety regulations. Close chuck protection. Do not leave the chuck key inside.  |
| 9. Switching off the machine   | Do not stop the three-jaw chuck by hand.  |

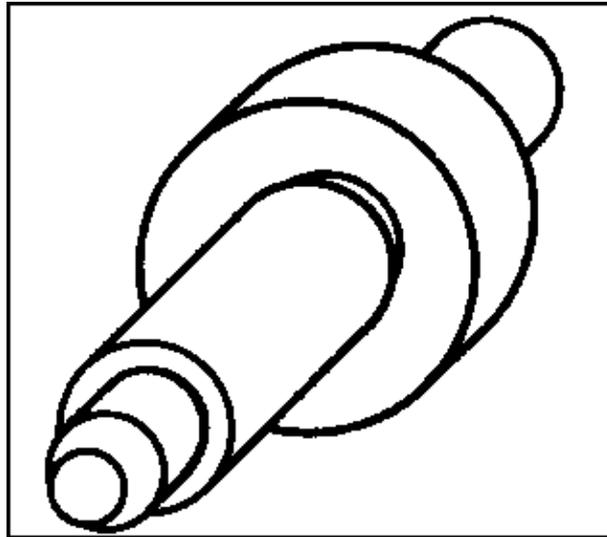


			1.1.
IBE	Handling the operation elements		3201

Handling the operation elements

**Instruction example 1.2.: Selection of the working means**

Demonstrated by the example of the manufacture of a pump shaft on a regular engine lathe.



Required previous knowledge

Read the drawing, kinds and application of the clamping and auxiliary means.

Explanations of the workshop sketch

Surface quality: finished	M24 x 1.5	M = metric thread
		24 = nominal diameter
		1.5 = pitch
Ø 40 h7: 40 = nominal diameter	A4 x 0.3	A = recess at the diameter
h = standard shaft		4 = width of the recess in mm
7 = quality		0.3 = depth of the recess below final size

**Sequence of operations**

**Remarks**

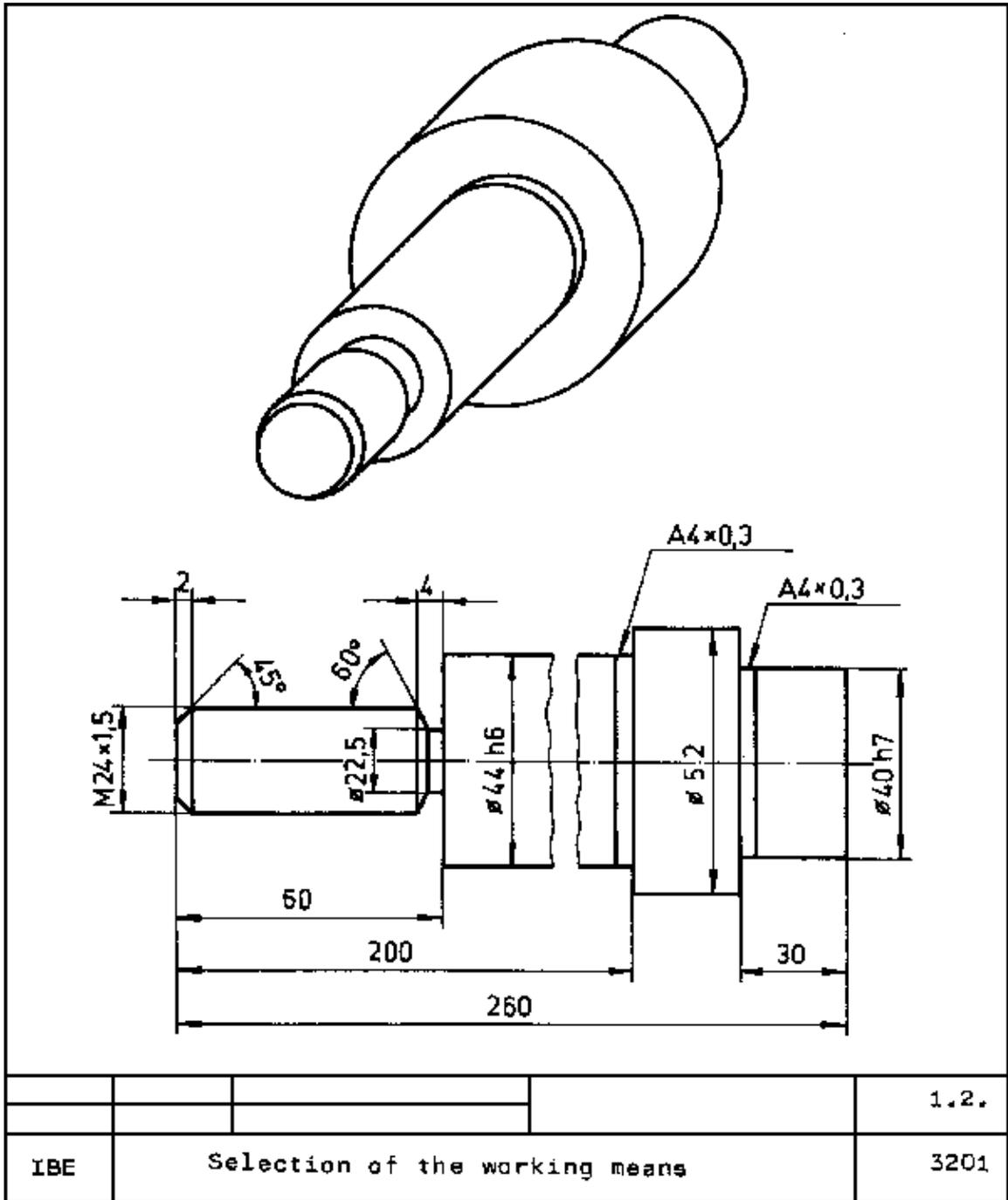
- |  |   |
|--|---|
| 1. Setting the driving plate                           | Length of the pin of the driving plate max. 24 mm, because the Ø 52, Ø 42 and Ø 24 are made at one setting. |
| 2. Selecting and clamping a firm centre                | After having placed the centre, it has to be checked as to true running and, if necessary, to be corrected. |
| 3. Placing the lathe carrier at disposal               | Select the lathe carrier corresponding to the diameter of the reception.                                    |
| 4. Right curved side cutting turning tool (3 mm width) | Making available various shims for placing the tool at centre.  |
| 5. Thread groove parting-off tool                      | To be selected according to the data of the drawing.  |
| 6. Right-curved roughing lathe tool                    | Visual inspection of the cutting edges.   |

7. Setting the tailstock

Pay attention to correct clamping.

8. Selecting the live centre

Select the machine taper corresponding to the quill of the tailstock, check the true running of the centre.

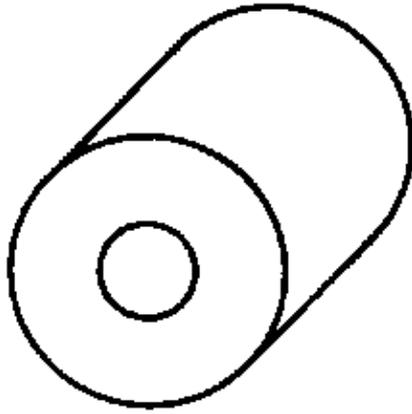


Selection of the working means

**Instruction example 1.3.: Clamping and aligning of workpiece and tool**

Material:

20 Mn Cr 5 low-alloy steel, 0.2 % carbon, 1.2 % manganese, less than 1 % chromium, rest: iron



### **Tools**

### **Auxiliary means**

Internal corner tool	Gripping jaws that can be bored
Boring tool	Shims
Undercut ting-tool	Hollowing rings
Clamping wrench	
Open-end wrench	

### Measuring and testing tools

Vernier caliper

Dial gauge

### Required previous knowledge

Kinds and application of clamping means and auxiliary means, reading of the technical drawing.

### Explanations of the workshop drawing

36 h 6: 36 = Nominal diameter

h = Basic shaft

6 = Quality

A4 x 0.3: A = Recess at the diameter

4 = width of the recess in mm

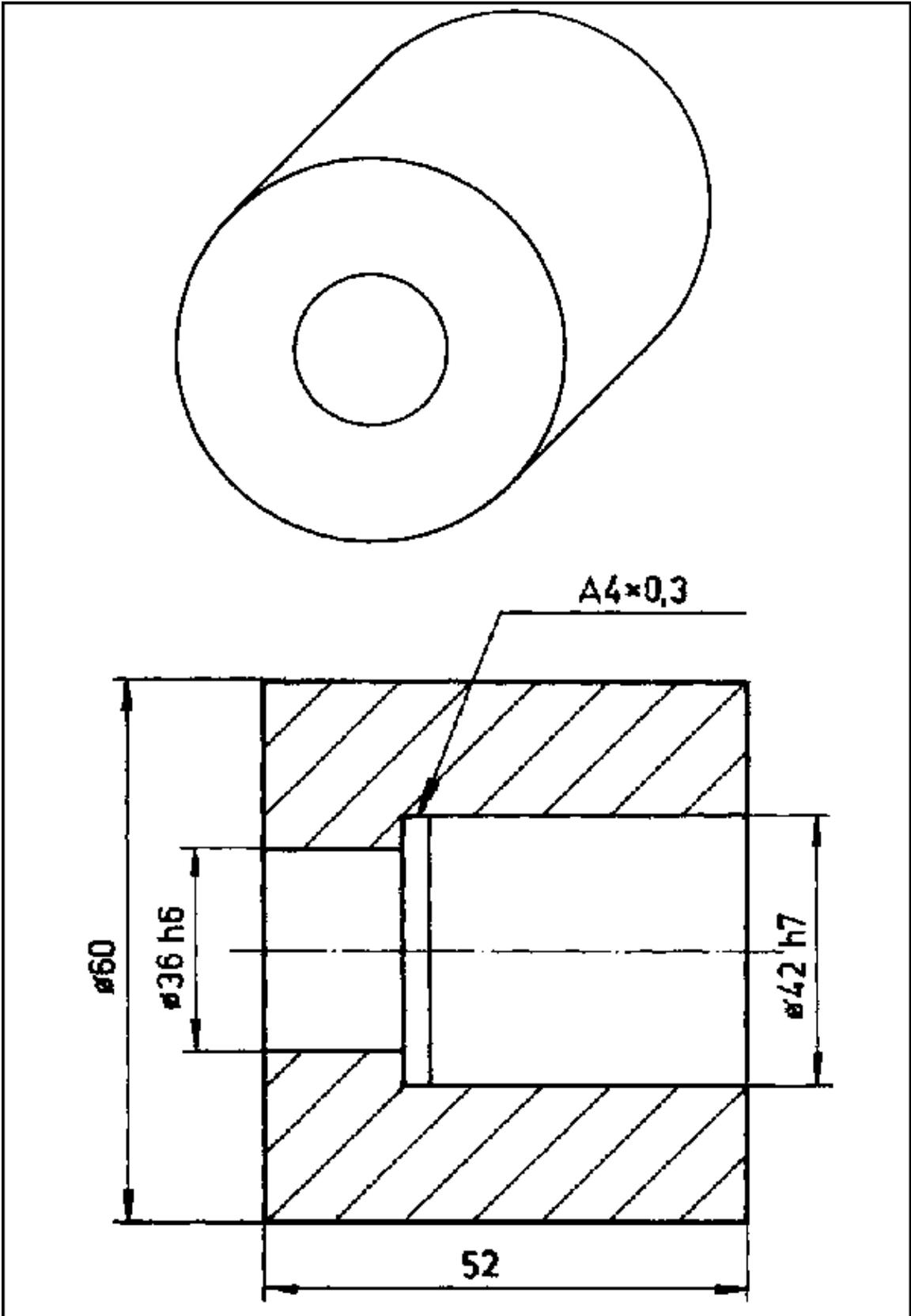
0.3 = Depth of the recess below final size

### **Sequence of operations**

### **Remarks**

- |   |  |
|---|--|
| 1. Putting in soft jaws.  | Use of soft jaws in order to secure true running and to maintain the surface quality of the workpiece.                                   |
| 2. Hollowing the soft jaws to $\varnothing$ 60 mm and a depth of 50 mm. | Use the required hollowing rings. When clamping, mark the clamping spot on the chuck and use the same place in all following operations. |
| 3. Clamping the workpiece.  | Pay attention to the clamping force – with too much force, the workpiece will be deformed. Use the marked clamping places.               |

4. Aligning the workpiece. Control the true running with the help of the dial gauge at the external diameter.
  
5. Clamping the tool. With multi-tool holders, clamp one drilling tool for through holes and blind holes, each as well as one undercutting tool of 3 mm in width, with the help of shims (with round tool shank – prism).
  
6. Aligning the tool. Pay attention to central position, required hollow grinding and length of the clamped part of the tool.



			1.3.
IBE	Clamping and aligning of workpiece and tool		3201

Clamping and aligning of workpiece and tool

## Instruction example 1.4.: Care and maintenance of the lathe

Demonstrated by the example of a regular engine lathe.

### Required previous knowledge

Qualities of lubricants and auxiliary agents, (lubricating schedule of the respective machine, operating instructions).

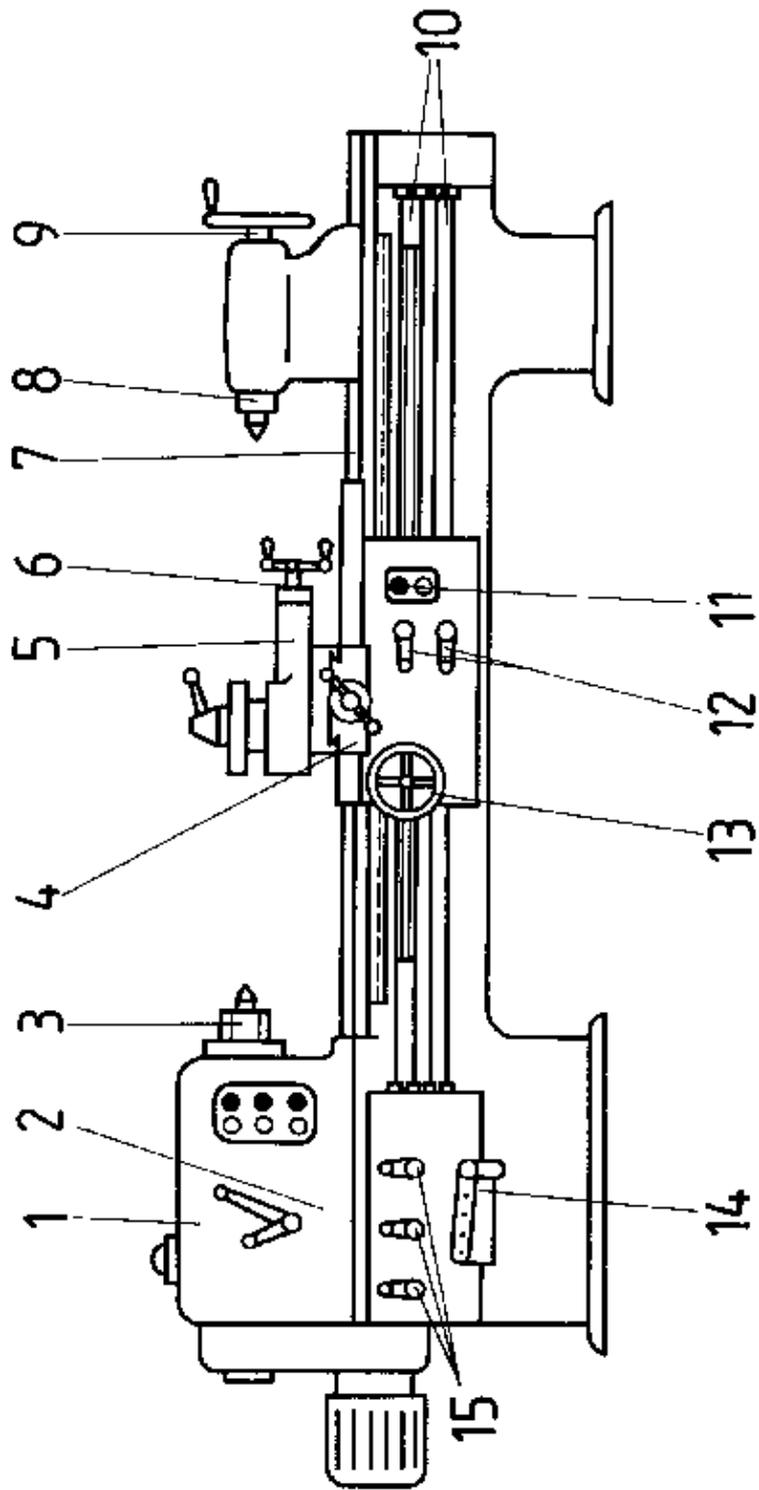
### Sequence of operations Kind of maintenance work

### Remarks Frequency of maintenance work

1. Cleaning of the guideway	Every day
2. Inspection of the oil level with the help of the oil-level gauge	Every day
3. Lubricating according to the lubrication schedule	Every day, every week, every three months, every six months
4. Cleaning the magnetic filter	Every three months
5. Draining off and replacing the oil	Every six months
6. Checking the contents of the coolant container	Every week
7. Cleaning the machine	Every week
8. Checking the bearing clearance	Every year
9. Checking contactors and limit switches	Every three months
10. Examining the lubrication pump	Every six months

The lubrication points of the lathe are given in the workshop sketch.

Permanent oil filling:	1
Oiling by the oil squirt:	2, 3, 6, 9, 10, 11, 12, 13, 14, 15
Oiling and cleaning of the sliding points:	4, 5, 7, 8



			1.4.
IBE	Care and maintenance of the lathe		3201

Care and maintenance of the lathe