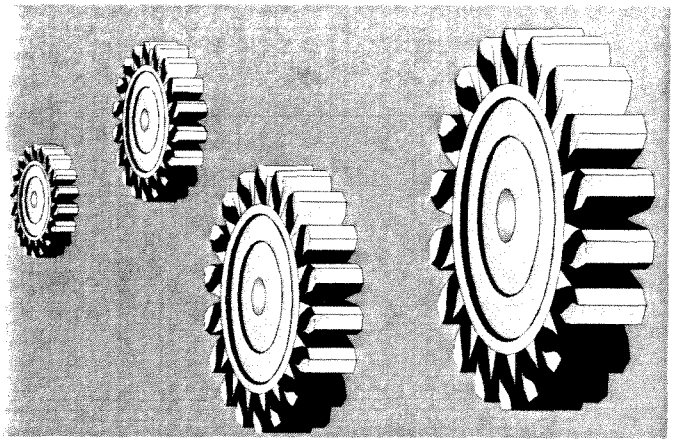


Chapter 13

The Lathe

Name: _____ Date: _____

Score: _____ Text pages 201–240

LEARNING OBJECTIVES

After studying this chapter, you will be able to:

- ○ Describe how a lathe operates.
- ○ Identify the various parts of a lathe.
- ○ Safely set up and operate a lathe using various work-holding devices.
- ○ Sharpen lathe cutting tools.

■ Carefully study the chapter, then answer the following questions in the space provided.

1. The back gear on a lathe system _____. 1. _____
   a. should be engaged while the spindle is rotating
   b. provides slower speeds with greater power
   c. moves the drive belt to another pulley ratio
   d. All of the above.
   e. None of the above.

2. The spindle on a lathe is hollow and tapered internally to _____. 2. _____
   a. allow the use of a knockout bar
   b. receive tools and attachments with taper shanks
   c. permit long stock to be turned without dangerous overhang
   d. All of the above.
   e. None of the above.

3. A _____ is seldom used on modern lathes. 3. _____
   a. long taper key spindle
   b. cam-lock spindle nose
   c. threaded spindle nose
   d. All of the above.
   e. None of the above.

4. The tailstock _____. 4. _____
   a. is essential for drilling operations on a lathe.
   b. permits taper turning to be done
   c. is necessary to support long work being turned
   d. All of the above.
   e. None of the above.

5. The _____ _____ provides instructions on how to set the lathe shift levers for various thread cutting and feed combinations. 5. _____

6. The _____ _____ transmits power to the carriage through a gearing and clutch arrangement in the carriage apron. 6. _____

7. When removing chips from a lathe, it is recommended that you use a(n) _____. 7. _____

8. To prevent rust from forming, a light coating of _____ _____ should be applied to all machined surfaces. 8. _____

9. When determining whether or not a lathe toolholder is a right- or a left-hand model, you can hold the head of the tool in your hand and note the direction the shank points. The shank of the left-hand toolholder points _____. 9. _____
   a. straight
   b. to the left
   c. to the right
   d. All of the above.

10. Cutter bits are ground to cut _____. 10. _____
    a. to the left only
    b. to the right only
    c. in either direction
    d. It depends on the work being done.

11. The deep cuts made to remove a large amount of material from a workpiece are called _____. 11. _____
    a. side relief cuts
    b. chafing cuts
    c. turret cuts
    d. None of the above.

12. What tool is ground flat on the face and designed for lighter turning? 12. _____

13. What will occur if tools designed for machining steel are *not* honed? _____

    _____

14. What is used to break the long continuous chips that are created when machining some metals? 14. _____

■ For problems 15–17, use the formula below to calculate the correct rpm for machining the materials given. Round off your answers to the nearest zero. Perform your calculations in the space provided.

$$\text{rpm} = \frac{\text{CS} \times 4}{\text{D}}$$

rpm = revolutions per minute

CS = Cutting speed of the particular metal being machined in feet per minute (fpm)

D = Diameter of work in inches

15. Aluminum, 3 1/2" diameter, CS = 600 fpm 15. _____

16. Mild steel, 1.250" diameter, CS = 100 fpm 16. _____

17. Tool steel, 2.375" diameter, CS = 50 fpm 17. _____

■ For problems 18–19, use the formula below to calculate the correct rpm for machining the materials given. Cutting speeds may also be given in meters per minute (mpm) when the work diameter is given in millimeters (mm). To find rpm for a given cutting speed in mpm, the meters must be converted to millimeters. This can be accomplished by multiplying the cutting speed by 1000. This conversion is included in the formula below. Perform your calculations in the space provided.

$$\text{rpm} = \frac{\text{CS} \times 1000}{3.14 \times \text{D (mm)}}$$

rpm = revolutions per minute

CS = Cutting speed of the particular metal being machined in meters per minute (mpm)

D = Diameter of work in mpm

18. Aluminum, 87 mm diameter, CS = 200 mpm 18. _____

19. Tool steel, 60 mm diameter, CS = 35 mpm 19. _____

20. A _____ chuck automatically centers work. All of the jaws move simultaneously. 20. _____
    a. 3-jaw universal
    b. Jacobs
    c. 4-jaw independent
    d. collet
    e. None of the above.

21. The jaws on a _____ chuck can hold irregular shaped work as each jaw has individual movement. 21. _____
    a. 3-jaw universal
    b. Jacobs
    c. 4-jaw independent
    d. collet
    e. None of the above.

22. A _____ chuck is normally fitted in the tailstock but can also be used to hold small diameter work for turning if fitted into the headstock. 22. _____
    a. 3-jaw universal
    b. Jacobs
    c. 4-jaw universal
    d. collet
    e. None of the above.

23. The chief advantage of a(n) _____ chuck is its ability to center work automatically and maintain accuracy over long periods of hard usage. It has the disadvantage of being expensive because

    _____

    _____.

24. What is the most accurate method for centering round stock in a 4-jaw chuck? _____

    _____

25. The jaws of a _____ chuck can be reversed to hold large diameter work. They cannot be reversed on a _____ chuck. 25. _____ _____
    a. 3-jaw independent, 3-jaw universal
    b. 3-jaw independent, 4-jaw universal
    c. 4-jaw independent, 3-jaw universal
    d. None of the above.

26. What is the most important safety precaution to remember when using a chuck? _____

    _____

    _____

27. The _____ dog has the setscrew recessed. 27. _____
    a. clamp-type
    b. bent-tail standard
    c. bent-tail safety
    d. All of the above.
    e. None of the above.

28. The _____ dog has the setscrew exposed. 28. _____
    a. clamp-type
    b. bent-tail standard
    c. bent-tail safety
    d. All of the above.
    e. None of the above.

29. The _____ dog is used for turning square or rectangular work. 29. _____
    a. clamp-type
    b. bent-tail standard
    c. bent-tail safety
    d. All of the above.
    e. None of the above.

30. A(n) _____ and countersink is usually used to drill center holes. 30. _____

31. How will the work be affected if the headstock center does not run true when working between centers? _____

_____

_____

32. Facing cuts can be made _____. 32. _____
    a. in an inward direction only
    b. in either direction
    c. in an outward direction only
    d. from the center and fed out only
    e. None of the above.

33. What does a *rounded nubbin* indicate? _____

_____

34. What does a *square-shoulder nubbin* indicate? _____

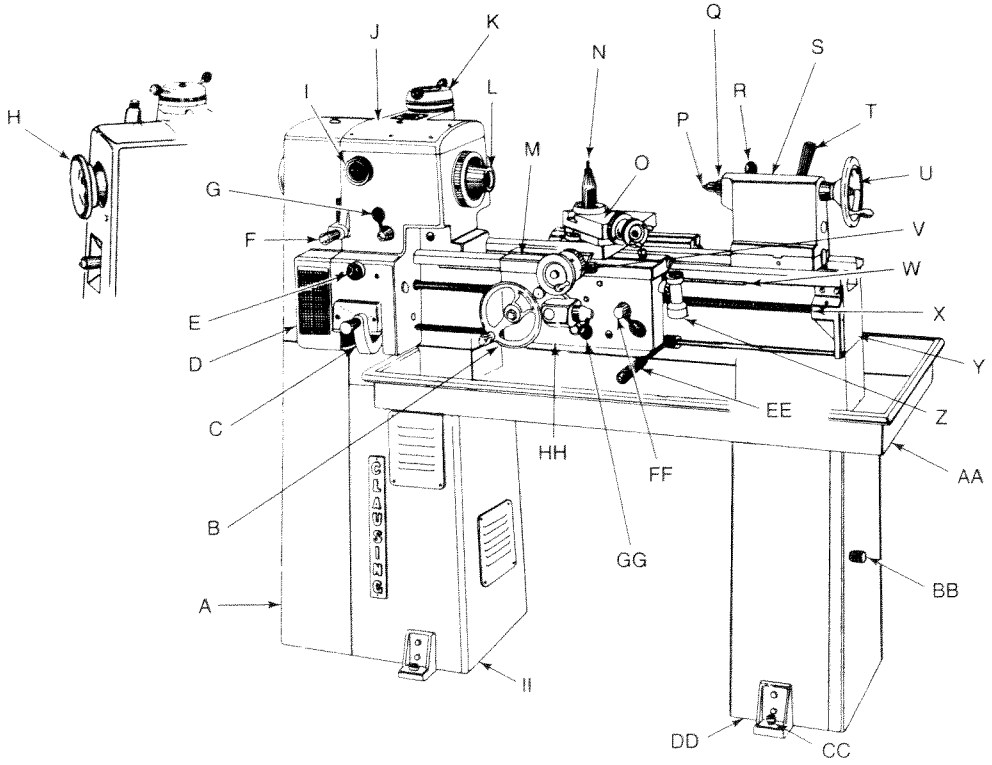
_____

35. *Never* attempt to perform a(n) _____ operation on work being turned between centers. 35. _____

36. What should be done to prevent *springing* when machining long work? _____

_____

37. Identify the parts indicated on the lathe illustrated below.



A. _____
B. _____
C. _____
D. _____
E. _____
F. _____
G. _____
H. _____
I. _____
J. _____
K. _____
L. _____
M. _____
N. _____
CC. _____
DD. _____
EE. _____
FF. _____

O. _____
P. _____
Q. _____
R. _____
S. _____
T. _____
U. _____
V. _____
W. _____
X. _____
Y. _____
Z. _____
AA. _____
BB. _____
GG. _____
HH. _____
II. _____

■ Use the illustration in question 37 to answer questions 38–50.

38. If item D is changed, the cutting tool will _____. (Assume that power is being transmitted through the gear box). 38. _____
a. cut deeper
b. move faster or slower
c. cut better
d. move faster or slower if the carriage is engaged to the lead screw
e. None of the above.

39. Item K _____. 39. _____
a. reduces or increases motor speed
b. increases power to the spindle
c. puts tension on the belt
d. changes spindle speed
e. None of the above.

40. Item X transmits power from the quick change gear box to the _____. 40. _____
    a. tailstock
    b. headstock
    c. spindle
    d. back gears
    e. None of the above.

41. Item L _____. 41. _____
    a. is removed with a hammer
    b. supports the work
    c. is lubricated each day
    d. makes the centers line up
    e. None of the above.

42. Item FF _____. 42. _____
    a. causes the cutter bit to move in and out
    b. engages the half-nuts for threading
    c. engages the clutch for automatic power feed
    d. locks the unit to the ways
    e. None of the above.

43. Item GG _____. 43. _____
    a. locks the unit to the ways
    b. engages the clutch for automatic power feed
    c. engages the half-nuts for threading
    d. causes the cutter bit to move up and down
    e. None of the above.

44. Item B _____. 44. _____
    a. moves the entire unit right and left on the ways
    b. moves the cutter bit in and out
    c. engages the unit for threading
    d. locks the unit to the ways
    e. None of the above.

45. Item GG engages the _____. 45. _____
    a. automatic power feed
    b. half-nuts for threading
    c. automatic power cross-feed
    d. unit to the ways
    e. None of the above.