

UNIT 1

THE ENGINE LATHE

The engine lathe is a power-driven machine tool used to turn and cut metal. It is one of the most useful and versatile machine tools in the workshop.

A lathe can perform many different operations. A few^① of the more common operations are facing, straight turning, taper turning, parting, necking, knurling, thread cutting, and forming.

Size

Lathe size is determined by swing and length of the bed (Fig. 1). The swing is twice the distance from the live center point of the spindle to the top of the bed,^② or the

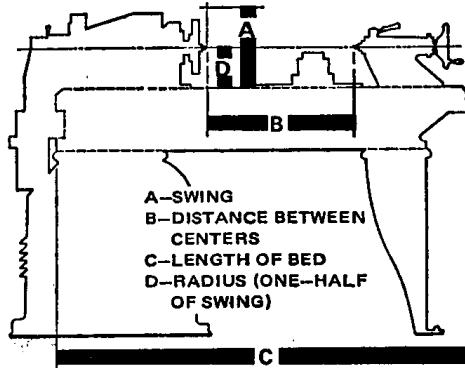


Fig. 1 Size is indicated by swing and the length of the bed.

largest diameter that can be turned over the ways^③ of a lathe. For example, a 10-in. lathe will^④ turn a 10-in.-diameter work-

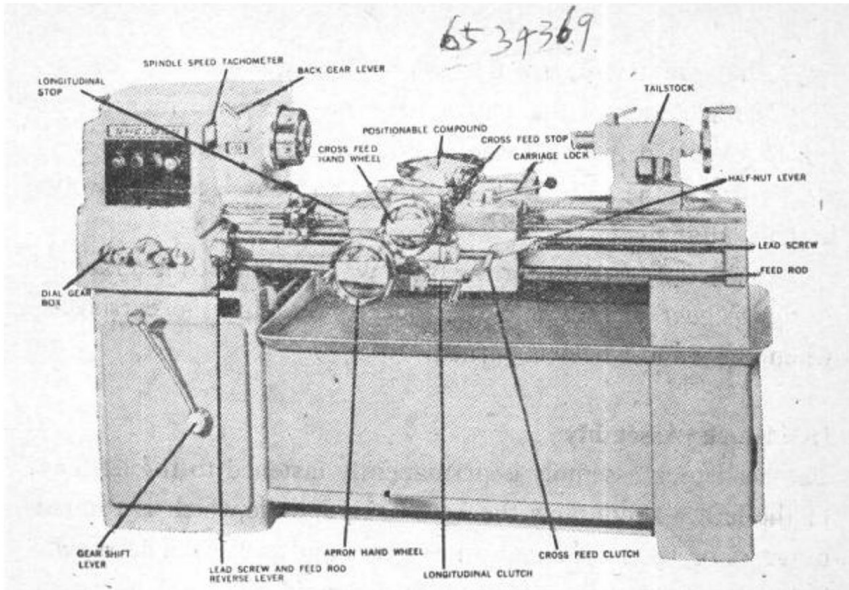
① a few: 几个; 少许; 一些。注意与 few (没有几个, 很少, 很少几种) 的意思相区别。 ② twice ... the bed: twice: 两倍于。twice the distance: 等于某距离的两倍; 比某距离大一倍。distance from ... to ...: 从...到...的距离。 ③ way(s): 导轨。 ④ will: 这里意思是“能”, 不是“将”。

piece over the ways, but not over the carriage cross-feed slide. Sometimes two numbers are used to indicate swing, such as 17-12. The 17-in. swing would be^① over the bed and the 12-in. swing over the cross slide.^②

The *length of the bed* includes the part the headstock rests on.^③ It determines also the distance between centers. A typical size might be^④ a 3-foot bed with a distance of 23 in. between centers.^⑤ Lathe beds are offered in many different lengths^⑥ for each available swing size.^⑦

A lathe should have a swing capacity and distance between centers that is at least 10 percent greater than needed to do any job^⑧ that may be required. Standard lathes come in a variety of designs and styles^⑨ and may have a swing ranging from about 9 to^⑩ 53 in. They are generally classified as^⑪ small, medium swing, and heavy duty (Fig. 2).

① **would be**: 会是。意思是“(在那种情况下)应当会是...”,有些假设的语气。
② **the 12-in.... cross slide**: 12-in. swing 后面省略 would be。 ③ **the headstock rests on**: 定语从句说明 the part, 从句开头的 which (或 that) 省略。rest(s) on: 安放; 搁置。
④ **might be**: 可能是; 本句是举例, 有些假设的意思。
⑤ **with a distance ... centers**: 两顶尖之间的距离为 23 英寸的(床身); “with + 名词 + 前置词短语 (between centers)” 结构, 进一步说明 bed 的情况。
⑥ **lathe beds ... lengths**: 提供的床身有好几种不同的长度; 提供好几种不同长度的床身。
⑦ **for each available swing size**: 对于每种规格的旋径尺寸。available 原意是: 可得到的; 可买到的; 现有的; 备有的。这里 each available 也可以译为“每种规格的”。
⑧ **at least 10 percent ...any job**: 比加工任何工件所需的(尺寸)至少大 10%。than 后面是过去分词短语。at least: 至少。表示同什么情况作比较。
⑨ **come in ... styles**: 这里意思是“制造成...式样和型号(或规格)供应市场”。come in: 以...(形式, 型号, 规格)供应市场。
⑩ **ranging from ... to...**: 范围从...到...。现在分词短语说明 swing。
⑪ **(are)... classified as**: 被分类为...



Bed

The *bed* is the base or foundation of the lathe. It is a heavy, rigid casting made in one piece.① It is the “backbone” of the lathe and holds or supports all the other parts. Located on the top of the bed are the *ways*.② More expensive lathes have a combination of V ways and flat ways. Less expensive lathes have flat ways only. Construction of ways varies according to③ make.④ Some builders use ways made of hardened steel⑤ that can be replaced if necessary. Others⑥ use flame-hardened

① **made in one piece**: 做成一个整体的; 过去分词短语说明 casting. made in ...: 被制作成...。 ② **Located ... the ways**: (位于)床身上部的是导轨。这是倒装句。科技文章中介绍什么东西在什么地方往往用这种句型: “状语(或表语) + is (或 are, stand(s), lie(s) 等) + 主语”(注意, 这类句中沒有宾语)。located on ...: 位于; 被放在...上。 ③ **varies according to ...**: 随...而异。 ④ **make**: 型号; 样式。是名词。 ⑤ **made of hardened steel ...**: 过去分词短语说明 ways. made of ...: 由...制做的。 ⑥ **others** = other builders: 另一些制造厂。与前面一句中 some builders相呼应。

ways that are an integral part of the bed section.

The accuracy of the ways determines the performance that can be expected from a lathe.① Ways must be true and accurate so that② the headstock, tailstock, and carriage are always in true alignment.

Located directly under the front ways on the bed is a rack.③ A pinion gear meshes into the rack for moving the carriage④ when the hand-wheel is turned.

Headstock Assembly

The headstock assembly is permanently fastened to the left end of the lathe. It contains the headstock spindle, which is rotated by gears or by a combination of gears and pulleys. The spindle holds the attachments which, in turn,⑤ hold and turn the workpiece. Spindles come in⑥ several quality ratings and are supported in headstocks by three to five bearings. Since⑦ the accuracy of the work done on a lathe⑧ depends on the axis of rotation of the spindle holding the workpiece,⑨ the spindle and all its accessories must be built and assembled with the greatest possible care.⑩

A hole extends through the spindle itself.⑪ The front end of this hole is tapered for holding tools having a tapered

① the performance ... a lathe: 一台车床的预期性能。expect ... from (...): 预期 (...)...。 ② so that ...: 从而使; 以便; 为的是。 ③ Located ... rack: 见上页注②。 directly: 正; 正好(地)。说明 under the front ways: 在前导轨正下方。 ④ for moving the carriage: 为了使大拖板移动。 for: 为了。 moving 是 for 要求的动名词。 ⑤ in turn: 又。 ⑥ come in: 见第2页注⑨。 ⑦ Since ...: 由于; 因为。 ⑧ done on a lathe: 车床上(被)加工的(工件)。过去分词短语说明 work。 ⑨ holding the workpiece: 夹持工件的(主轴)。现在分词短语说明 spindle。 ⑩ with the greatest possible care: 尽可能小心地。 ⑪ A hole...itself: 逐字直译: “一个孔(延伸)穿过主轴(本身)全长”。意译“主轴本身有一个通孔”。 through: 穿过...(全长)。

shank①. A *taper sleeve* (a hollow-round part) fits into② the taper spindle hole, when holding a headstock, or live center③. The headstock center is called a *live center* because it turns with④ the work. The center is a tapered metal part with a pointed end. It is used to⑤ support the end of a workpiece as it is being turned.⑥ All lathe center points have a 60-degree (°) included angle.⑦

Three common types of spindle noses are used to hold attachments on the spindle.

1. The *threaded spindle nose* has been used on lathes longer than⑧ any of the other types. Attachments to be mounted⑨ are screwed onto⑩ the spindle until they fit firmly against⑪ the spindle flange. The major disadvantage of the threaded spindle nose is that turning cannot be done in the reverse position⑫ (with the spindle turning clockwise).⑬ This is because certain attachments, a chuck for example, would come loose.⑭

2. The *cam lock spindle nose* has a very short taper which fits into a tapered recess in the back of a faceplate or chuck.

① for holding ... shank: 以便夹持带有锥柄的各种工具。for 的用法见第4页注④。having ... 是现在分词短语说明 tools。② fit(s) into ...: 插入; 放入; 装进; 和...配合。③ when holding ... center: 当夹持床头箱顶尖(即: 活顶尖)时。when 可以和现在分词或过去分词一起做时间状语。or: 即。④ turn(s) with ...: 随着...旋转。⑤ is used to + 动词原形: (被)用来(做)。⑥ as it ... turned: 当它(工件)正在被车削时。时间状语副句, 说明 support. as: 当...时。is being turned: 现在进行时被动语态。⑦ included angle: 夹角。⑧ longer than ...: 时间比...更长。⑨ to be mounted: 要(被)安装的; 待安装的。不定式短语(被动态)做定语说明 attachments。⑩ are screwed onto ...: 被拧到...上。⑪ fit ... against (...): 紧贴在(...)上。⑫ turning ... position: 车削不能向相反的方向进行; 不能(进行)反转车削。turning: 动名词, 作主语。⑬ with the spindle turning clockwise: 主轴顺时针转动。“with + 名词 + 现在分词”结构, spindle 是意思上的主语。turning 是意思上的谓语。用来进一步说明 in the reverse position。⑭ would come loose: 会松脱。would: 会; 如果那样做的话就会; 表示假设的语气。

A series of cam lock studs projects from the back of the faceplate or chuck. These cam lock studs fit into the holes in the spindle nose. They are locked into position^① by turning a series of cams.^②

3. The *long (steep) taper key drive spindle nose* has a long taper with a key attached^③ and an internal threaded collar.^④ The faceplate or chuck must have an equal taper and keyway plus an external thread. This positive lock-type of spindle is most popular on medium-size lathes. It permits cutting with the spindle turning in either direction^⑤.

Power for driving the spindle^⑥ is provided by an electric motor. There are four common ways of transmitting the power from the electric motor to the spindle. These include:

1. *Flat belt drive*. On most belt-driven lathes, direct drive power is delivered through belts to a step pulley attached to the spindle.^⑦ The spindle speed is changed by moving the belt to different positions on the step pulley.^⑧ To obtain slower speeds and more power, back gears are used (Fig. 3).

To understand how the back gears operate,^⑨ study Fig. 3. Notice that gear F is fastened securely to the spindle. This

① **locked into position**: (被)锁定就位; 被固定在应有的位置上。 ② **by turning a series of cams**: 用转动一组凸轮的方法。 **by**: 用...方法。动名词短语 **turning ... cams** 是 **by** 要求的。 ③ **with a key attached**: 上面装有一根键。是“with + 名词 + 过去分词”结构, 说明 **long taper**。 ④ **an internal threaded collar**: **with** 要求的, 与 **a key attached** 并列。 ⑤ **with the spindle ... direction**: 不论主轴是正转还是反转。是“with + 名词 + 现在分词”结构, 表示附带情况。 **turn in ... direction**: 朝...方向转。 **either**: 两者中任何一个。 ⑥ **for driving the spindle**: (用来)驱动主轴的。说明 **power**。 ⑦ **attached to the spindle**: 安装在主轴上的。过去分词短语说明 **step pulley**。 ⑧ **by moving ...step pulley**: 通过把皮带移动到塔轮的不同位置上。表示方法。 ⑨ **how the back gears operate**: 背轮是如何作用的。名词副句, 做 **understand** 的宾语。

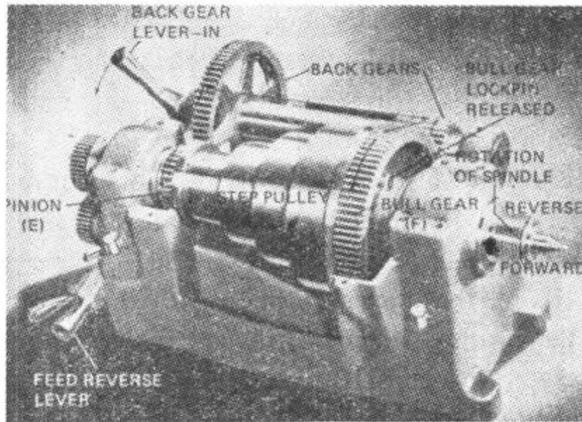


Fig. 3 A flat belt-driven lathe. The use of the back gears reduces the speed and increases the power.

gear is often called a *bull gear*. The small end of the step pulley has a small gear attached to it^① called the *pinion gear*.^② This gear (E) always turns when the pulley turns. The step pulley and pinion gear are connected with the bull gear by a sliding pin called the *bull-gear lock-pin*. At the back of the headstock are two gears mounted on the same shaft. They are spaced to line up or mesh with the bull gear (F) and pinion gear (E). These are called *back gears*. To engage the back gears, the pin in the bull gear is pulled out^③ (when the pin is out,^④ the pulley and pinion gear will turn, but the spindle will not turn). Pull the back-gear handle forward to mesh the back

① **has a small gear attached to it:** 上面装有一个小齿轮。是“have + 名词 + 过去分词”结构,这里 attached to it 进一步说明 a small gear 的情况。it: 代替 small end. ② **called the pinion gear:** 定语,说明 a small gear. ③ **the pin in the bull gear is pulled out = pull out the pin in the bull gear.** 英语科技文章中经常用被动语态的句子来表示一种婉转的命令式。下面两句直接用命令式。 ④ **when the pin is out:** 当销子(被)拔出时。

gears with bull gear F and pinion gear E. Do this^① by turning the step pulley *by hand*—*never* while the power is on.^② When engaged,^③ power is delivered directly to the bull gear (F) and spindle by the back gears.

At the left end of the headstock assembly is a *feed reverse lever*. It is used for reversing the direction or movement of the lead screw. This lever can be moved to three positions. When it is in the upper position with the automatic feed engaged, the carriage will move toward the headstock (to the left) and the cross-feed will move in. When in the center position,^④ the gears are out of mesh^⑤ and the lead screw will not move. When in the lower position with the automatic feed engaged, the carriage will move toward the tailstock (to the right) and the cross-feed will move out.

2. *V-belt drive*. A V-shaped groove is cut around the circumference of each pulley, and a V belt fits accurately into this groove. The V belt does not touch the bottom of the pulley. This type of drive has a back gear arrangement similar to that used on flat belt machines^⑥.

3. *Variable-speed drive*. In this arrangement it is possible to change the speed^⑦ between the driver and driven pul-

① Do this: 做这个。指上面讲的 pull the back gear handle forward. ② never while the power is on = never do this while ...: 决不要在通电时这样做。the power is on: 电源接通。③ When engaged: 在啮合时; “when + 过去分词”: 在句中作时间状语。④ When in the center position: “when + 前置词短语” 在句中作时间状语。⑤ out of mesh: (齿轮) 脱离开; 不啮合; 切断。⑥ similar to ... machines: 同用于平皮带车床上的相类似的背轮装置。是形容词短语说明 arrangement. similar to ...: 和...类似。that: 代替 back gear arrangement. used on ...: 说明 that. ⑦ it is possible ... speed: 可以改变转速。it 是形式上主语, 真正主语是 to change the speed.

leys without stopping the lathe^①. In fact, the speed must be changed *only when the machine is running*.^② The driving pulley of a variable-speed drive is made with^③ two parts having V-shaped sides.^④ One side of the pulley may be opened or spread apart from^⑤ the other side. As^⑥ it spreads apart, the belt moves inward toward the smaller diameter,^⑦ producing a slower speed^⑧ on the driven pulley. As the sides of the pulley are brought together, the belt is forced outward toward the large diameter^⑨ which^⑩ increases the speed of the driven pulley. The speed change may be done either manually or hydraulically. On the hydraulic type, a control dial located on the top of the headstock accurately activates the hydraulic system. Do not turn the control dial unless^⑪ *the motor is running*. Speeds are from 300 to 1,600 revolutions per minute (rpm) in direct drive. For^⑫ slower speeds, the lathe must be stopped and the back gear knob moved.^⑬ This will provide slower speeds of 43 to 230 rpm.

4. *Geared head*. This headstock contains gears and changing mechanisms for obtaining many different spindle speeds. The speed index plate attached to the headstock^⑭ will

① **without stopping the lathe**: 在不停车的情况下; 不必停车。without: 不; 没有; 不必; 不致。 ② **the speed ... is running**: 必须在床子运转时才能改变转速。 ③ **is made with ...**: 由...做成。 ④ **having V-shaped sides**: 现在分词短语说明 parts。 ⑤ **spread apart from ...**: 与... 分离。 ⑥ **as**: 当...时。 ⑦ **moves inward toward the smaller diameter**: 沿径向向里移动(直径变小)。 ⑧ **producing a slower speed**: 现在分词短语,表示结果。 ⑨ **is forced outward toward the large diameter**: 被迫沿径向向外移动(直径变大)。 ⑩ **which**: 代替前面 the belt is ... diameter 的内容。 ⑪ **unless**: 除非; 如果不。 ⑫ **For**: 为了获得...。 ⑬ **the back gear knob moved**: moved 与 stopped 并列。moved 前省略 must be。 ⑭ **attached to the headstock**: 安装在床头箱上的。说明 plate.

help the operator select the required speed. Two or three levers or knobs must be moved to adjust the speed.

Tailstock Assembly

The tailstock can be moved along the bed ways and clamped

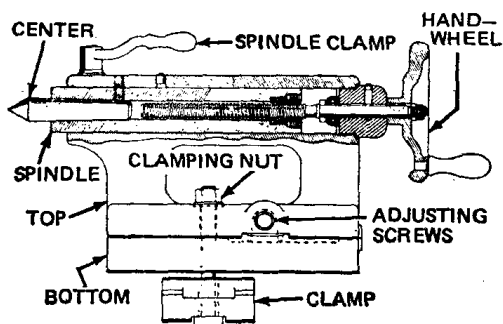


Fig. 4 A cutaway showing construction of the tailstock.

in position^① (Fig. 4). It consists of two castings or main parts. The lower part rests directly on^② the ways, and the upper part rests on the lower part. Adjusting screws hold the parts

together.^③ The upper casting can be moved toward or away from^④ the operator to offset the tailstock for taper turning and to realign the tailstock center for straight turning. The *tailstock spindle* or *ram* moves in and out of the upper casting when the *tailstock handwheel* is turned. This spindle has a taper hole into which the dead center or other tools such as drills and reamers fit.^⑤ Only tools having the same taper as the tailstock spindle^⑥ should be placed in the spindle hole.

① (be) clamped in position: (被)固定就位; (被)夹紧在恰当位置上; 固定在应有的位置上。 ② rest(s) on ...: 架在...上; 安放在...上; 搁置在...上。

③ hold ... together: 将...紧固在一起。 ④ away from ...: 离开..., 向离开... 的方向。 ⑤ into which ... fit: 定语从句, 说明 hole. which 是关系代词, 代替 hole. 定语从句中, into which 同 fit 发生关系。fit into: 插入; 嵌入; 和...配合。 ⑥ having...the tailstock spindle: 锥度与尾架套筒一致的。现在分词短语说 tools. the same ... as (...): 与(...)一样的....

To remove tools from the spindle, it is only necessary to back up on the handwheel^① until the spindle end is nearly inside the casting. The end of the screw that moves the spindle^② loosens the taper shank so^③ it can be removed.

Care must be taken to^④ avoid using a taper which does not fit properly. When this happens, it is not possible to use the handwheel screw to remove the taper. Such a taper may be removed without damaging the tailstock spindle^⑤ using either of two methods:^⑥

1. Run the tailstock spindle or ram out a short distance.^⑦ Open the chuck jaws on the three-jaw chuck. Slide the tailstock forward until the stuck taper can be clamped in the chuck jaws. Tighten the tailstock clamp, and back up^⑧ the handwheel to remove the part from the spindle.

2. Fasten a lathe dog^⑨ on the end of the part that is stuck in the spindle. Use a mallet to tap the dog and remove the part.

Care must be used when backing up^⑩ the tailstock handwheel. If backed to the end of the screw^⑪ with any great force,^⑫ it will jam. This strains, or may even damage, the threads inside^⑬. Also, when the screw is jammed, it is usually

① **it is only...the handwheel**: 只需将手轮往回摇。它是形式上主语,真正主语是 to back up (往回摇)。② **that moves the spindle**: 定语从句,说明 screw。③ **so**: 所以。④ **Care must be taken to** (+动词原形)=take care to(+动词原形): 必须小心(做)。⑤ **without damaging the tailstock spindle**: 而又不(致)损坏尾架套筒。without: (而)不致(引起)。⑥ **using either of two methods**: 采用两种方法之一。现在分词短语表示方法。either of ...: (两者中)任一个。⑦ **Run ...out a short distance**: 摇动...向外伸出一短距离。run... out: 使...伸出;使...出来。⑧ **back up**: 往回摇;向后退。⑨ **lathe dog**: 鸡心夹头;车床轧头;卡箍。⑩ **when backing up ...**: 当往回摇...时。“when + 现在分词”: 作时间状语。⑪ **If backed to the end of the screw** = If it is backed... back to: 摇回到;退回到。⑫ **with any great force**: 用稍微大点的力。⑬ **inside**: 里面的。说明前面的 threads。

impossible to move the handwheel forward^① by hand. When this happens, good judgment on your part^② prevents further damage. Place a large monkey wrench^③ on the rim of the handwheel, and move it forward. Never attempt to hammer on the handle of the handwheel to free it.^④

The *dead center* or *tailstock center* is a hardened taper part that fits the spindle hole. The outer end has a 60° point.^⑤ This supports the end of the workpiece when turning between centers, or when turning long work that extends from a chuck. It is called a dead center because it does not revolve.

A *revolving dead center*, sometimes called a *live dead center*, is also available.^⑥ This type of center has ball or tapered

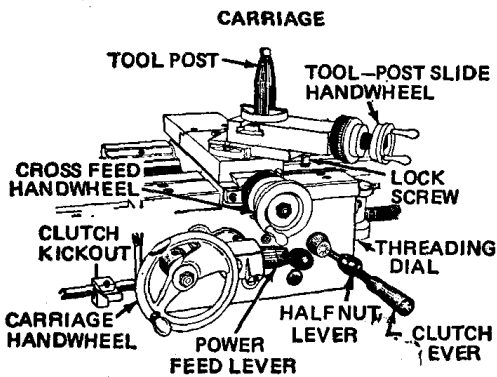


Fig. 5 Carriages.

roller bearings^⑦ that permit the center to rotate with^⑧ the workpiece. No lubrication is required between the center and the workpiece. ✓

Carriage

The carriage (Fig. 5)

controls and supports the cutting tool. It has five major parts:

① to move the handwheel forward: 向前摇动手轮。 ② on your part: 在你那方面; 由你作出的。说明 judgement。 ③ monkey wrench: 活(动)扳手。 ④ to free it: 把它松开。 ⑤ point: 尖头; 尖端。 ⑥ available: 可得到的; 可买到的; 备有的; 市场上供应的。 ⑦ ball ... bearings = ball bearings (滚珠轴承) or tapered roller bearings (锥形滚柱轴承)。 ⑧ with: 随着...; 同...一起。

1. The *saddle* is an H-shaped casting that fits over^① the bed and slides along the ways. The *carriage lock screw* in the saddle locks^② the carriage to the bed for facing and cutoff operations.

Caution

Be sure to^③ release the lock before moving the carriage.

2. The *apron* is fastened to the saddle and hangs over the front of the bed. It contains the gears, clutches, and levers for operating the carriage by hand and power feeds. The apron handwheel can be turned to move the carriage longitudinally (back and forth) by hand. It is attached to a pinion gear that meshes with the *rack* under the front of the bed. The apron also contains friction clutches for the automatic feeds and a *splitnut*. The splitnut can be closed over^④ the lead screw threads and is used only when cutting screw threads.

3. The *cross slide* is mounted on the saddle. The cross-piece of the saddle is machined with^⑤ a dovetail way or bearing. The dovetail is exactly at a right angle to^⑥ the center line of the lathe itself. The cross slide also has a dovetail that fits over the saddle dovetail. The cross-slide handle is turned to move the slide *transversely* (in or out from the operator).

4. The *compound rest* is mounted on top of the cross slide. It can be turned in a 360° circle and clamped in any position.

① **fit(s) over:** 套在...外面; (套在...上) 与...配合。 ② **locks:** 是动词。前面一个 lock 是名词。lock screw: 锁紧螺钉。 ③ **be sure to** (+动词原形): 一定要(做); 务必(做)。 ④ **be closed over:** 在...上闭合。 ⑤ **is machined with:** 被加工成有...。 ⑥ **is ... at a right angle to ...:** 同...成直角; 同...垂直。

The bottom of the compound slide is graduated in degrees for a distance of half a circle,^① or 180°. This part, too, has a dovetail slide that permits the upper part to be moved^② by means of^③ a precision screw. Both the cross slide and the compound-rest screws are equipped with^④ micrometer collars (graduated dials) divided into thousandths of an inch. These are used in making accurate adjustments when turning workpieces to close measurements^⑤ and when cutting screw threads.

5. The *tool post* with *ring collar* and *rocker* slides in a T slot on top of the compound rest. The tool post clamps and holds the toolholder securely in position.^⑥

Feeding and Threading Mechanism

The feeding and threading mechanism consists of a quick-change gearbox, a lead screw,^⑦ a feed rod,^⑧ and the gears and clutches in the apron. The *quick-change gearbox* is located directly below the headstock assembly. Power from the left end of the spindle is transmitted through gears to the quick-change gearbox. This gearbox contains a number of^⑨ different-sized gears, which^⑩ provides a means to change (1) the rate of feed and (2) the ratio between revolutions of the headstock spindle and the movement of the carriage for thread cutting.

① for a distance of half a circle: 半圈。for a distance of: 一段(距离, 长度); 在(距离, 长度)范围之内。 ② permit(s) ... to be moved: 允许其上部移动。permit ... to (...): 允许...(做)。to be moved 是 to move 的被动形式。 ③ by means of: 用; 通过。 ④ (are) equipped with: 装有; 装备有。 ⑤ to close measurements: 至准确尺寸。 ⑥ hold(s) ... in position: 把...固定就位; 把...夹紧在应有的位置上。 ⑦ lead screw: 丝杠。 ⑧ feed rod: 进给杆; 光杠。 ⑨ a number of: 一些; 若干; 许多。 ⑩ which: 指前面 This gearbox ... gears 一句的内容。

Usually two or three levers must be moved to obtain the correct feed or the correct number of threads per inch. An *index chart* or *plate* is attached to the front of the gearbox and indicates the position of the levers for obtaining the desired feed or threads per inch. The *lead screw* and *feed rod* transmit the power to the carriage for operating the automatic feed and for thread cutting. On smaller lathes, one feed rod is used, but on larger lathes, there are two separate rods.

You can get power feed of the carriage for either longitudinal movement or cross-feed movement. The direction of longitudinal feed is controlled by the position of the *reverse lever* on the headstock. Power feed is obtained in various ways^① using different control levers.^②

1. On older machines, the *feed-change lever* on the apron is moved to the *up* position for longitudinal feed (*down* on some lathes). Then the automatic feed knob is turned to the right to start the carriage moving.^③

To operate the cross-feed automatic, move the *feed-change gear* to the *down* position. Turn the same automatic feed knob to the right. The direction of cross-feed (in or out) depends upon the position of the reverse lever on the headstock.

2. A second type of lathe has a feed-selector lever that is moved up for longitudinal feed and down for cross-feed. Then a clutch is moved to operate the power feed.

3. A third type has a power longitudinal feed lever or clutch and a separate cross-feed lever or clutch.

4. Manufacturers of large lathes use other types of

① **in various ways:** 以不同方式。 ② **using ... levers:** 分词短语作状语, 表示方式。 ③ **to start the carriage moving:** 使大拖板开始移动。不定式短语表示目的。 start + 名词 + 现在分词: 使...开始(做)。

controls. All lathes have a reverse lever for the lead screw and/or feed rod^① located near the headstock spindle.^②

For thread cutting, the feed-change lever on the apron is placed in the center or neutral position (or the power-feed levers and clutches are released). Only in this position will^③ the *halfnut* (splitnut) operate. This is a nut split lengthwise^④ that closes over^⑤ the Acme threads of the lead screw when the *halfnut lever* on the apron is moved. Closing the halfnut causes the carriage to move a fixed distance^⑥ for each revolution of the spindle.^⑦ The direction it moves^⑧ (right or left) depends upon the position of the feed-reverse lever on the headstock. To cut a right-hand thread, the carriage must move from right to left, or toward the headstock. To cut a left-hand thread, the carriage must move from left to right, or toward the tailstock. The splitnut is used only for thread cutting and never for any other operation.

Work-holding Attachments for the Lathe

The range and variety of work that can be done on a lathe are greatly increased through the use of various work-holding attachments. Some of the common attachments are three-

① All lathes ... feed rod: 所有的车床都为丝杠和/或光杠装有反向手柄; 所有车床都装有(操纵)丝杠和/或光杠的反向手柄。 ② located near the headstock spindle: 位于床头箱主轴附近。说明 reverse lever. ③ Only in this position will: 以 Only 开头的句子中,要把谓语中 will, can 等词提到主语之前。本句谓语是 will operate. ④ split lengthwise: 沿纵向对开的; 沿纵向拼合的。过去分词短语,说明 nut. ⑤ close(s) over: 在... 上闭合。 ⑥ causes ... distance: 使大拖板移动一定的距离。cause (+ 名词 + 动词原形): 使...(做)。 ⑦ for each revolution of the spindle: 主轴每转一圈就。for each revolution of ...: ... 每转一圈就。 ⑧ it moves: 它移动的。定语从句说明 direction. it 代替 carriage.

jaw universal chuck, four-jaw independent chuck, collet chuck, faceplates, follower rest, and steady rest. Most of these work-holding tools are described in later units.

For turning work between centers, a *reducing sleeve* and *live center* are inserted in the headstock spindle. A drive plate is mounted on the threaded nose of the spindle. It has slots into which the tail of a lathe dog fits^① and is used for driving the lathe dog which is attached to the workpiece. A workpiece can also be clamped or bolted to a faceplate. A faceplate is much larger in diameter than a drive plate and has more slots.

Lathe dogs are considered^② accessories rather than^③ work-holding tools. They are clamped on workpieces to drive them^④ when turning between centers. There are three common types. The *bent-tail standard-type* has an exposed setscrew. The *bent-tail safety-type* has a headless setscrew to prevent catching in the sleeve or otherwise^⑤ injuring^⑥ the operator. The *clamp-type* lathe dog is used on rectangular or square-shaped work. It may be used on round work when the driving force required is not too great. These lathe dogs are available in sizes^⑦ that range from $\frac{1}{4}$ to 8 in. You should always select the smallest size that will fit over^⑧ your work. Large, heavy dogs cause the lathe to vibrate and will eventually damage the spindle bearings. Avoid using a dog with an exposed setscrew. There is always

① **into which ... fits:** 定语从句说明 slots. which 代替 slots. fit into: 插入; 嵌入; 和...配合。 ② **are considered:** 可看做是; 被认为是。 ③ **rather than:** 而不是。 ④ **to drive them:** 来带动工件; 来转动工件。表示目的。 ⑤ **otherwise:** 用其它方式。副词, 说明后面 injuring. ⑥ **injuring:** 与前面 catching 并列, 是 to prevent 要求的。 ⑦ **are available in sizes (...):** 以(...)尺寸供应市场; ...的尺寸规格有(...)。 ⑧ **fit over ...:** 套在...上; 套在...外面(同...相配合)。