The Small General Shop

For the Modern School

A view of the Small General Shop

Teaching the Fundamentals of the Following Trades:

Machine Shop	Motor Mechanics
Electrical Shop	Mechanical Drawing
Forging Shop	Wood Working

Bulletin No. 50

March, 1931

SOUTH BEND LATHE WORKS

428 East Madison Street South Bend, Indiana, U. S. A.

Interior View of a Typical Small General Shop in a Rural Consolidated School
Price of Shop Equipment as illustrated (see pages 12 and 13) $888.50

The Small General Shop

In the Small General Shop, the fundamentals of several practical trades, such as auto mechanics, electrical work, machine work, wood work, mechanical drawing, etc., may be taught. The average one-room, one-instructor shop, such as is outlined in this bulletin, will take care of 15 or more boys each period. With additional equipment a larger number of boys can be taught by one instructor.

The most desirable location for a General Shop is on the ground floor where automobiles, trucks, tractors, etc., may be driven in, so that they may be worked on by the boys in the motor mechanics unit. Plenty of light and good ventilation are valuable features. However, the ideal room is not always available and many shops are doing excellent work in rooms not originally intended for shop work.

In schools already equipped with a manual training or woodworking department the General Shop may be built up by adding the various units to that department. If there is no available room in the present school building it is advisable to erect a separate shop building. Some schools have built their own shops at a very small cost as a project in carpentry and building trades. See page 24.

The principal machine equipment of the General Shop consists of a back-geared screw-cutting lathe, a bench drill press, bench grinder and a forge. These machines, as well as a number of small tools and other general equipment are used in common by all units of the General Shop as the occasion may require. The average life of this equipment is about 25 years.

In planning a General Shop for the small school we have studied many of the leading authorities and consulted with the foremost educators on the subject. In addition, we have drawn on our experience of 25 years in our own manufacturing plant where we have trained more than 2,000 apprentices. The instruction books and the shop equipment have been selected to meet the requirements of the boys in General Shop work from the 7th to the 12th grades.

Outline of a General Shop Course

For One Instructor—15 or more Pupils at One Time

The General Shop course outlined briefly below includes six important subjects that are widely used for instruction in shop work in the 7th to 12th grades. This shop is of a suggestive nature, and may be varied to suit local conditions. If any particular trade or occupation dominates the community, it should be included in the course.

Subjects Taught:

Machine Shop	Motor Mechanics
Electrical Shop	Mechanical Drawing
Forging Shop	Wood Working

Principal Equipment:

In teaching the fundamentals of machine shop, electrical work, forging and motor mechanics, the machines and tools listed below are used. These machines are illustrated, described and priced on pages 10 to 13.

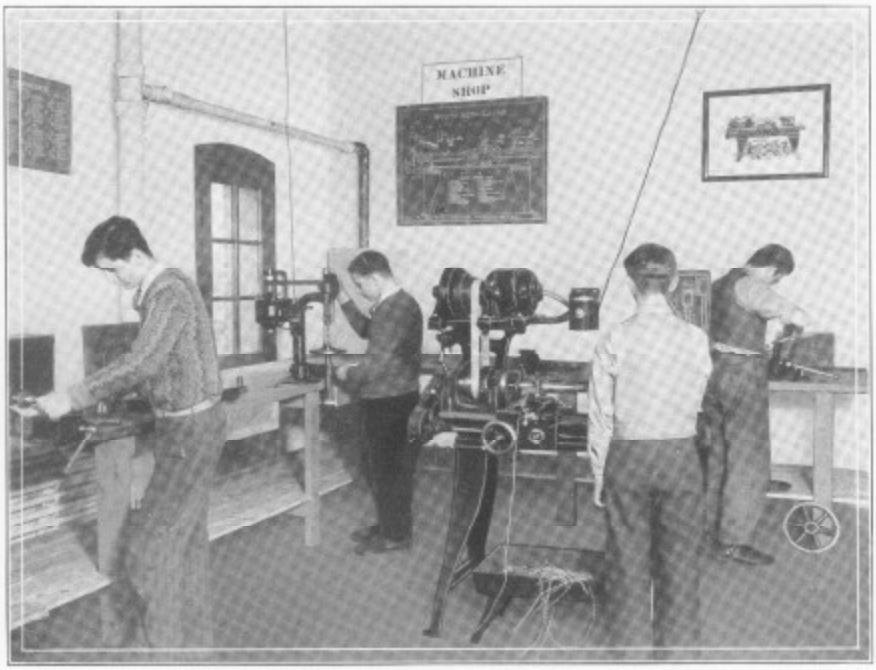
1—9"x4' Back-Geared Screw-Cutting Lathe.
1—8", Two-wheel Bench Grinder.
1—10" Bench Drill Press.
1—Forge and Anvil.
Also benches, cabinets and an assortment of small tools and supplies.

Room Size:

The size of the room required for a small General Shop, as outlined in this bulletin, is approximately 24'x36', or from 800 to 1,000 square feet of floor space. Plenty of daylight is a very desirable factor, but good artificial lighting is satisfactory.

Instruction Methods:

Project system used (see pages 16 to 21). Blue Prints, Job Sheets aid instructor in teaching.
Skilled mechanic may be called in occasionally for demonstration.
Visits to commercial shops and factories.
Lectures and class discussions.
Study texts and reference books.



Machine Shop Unit of a Small General Shop

Machine Shop Unit of the General Shop

This is the mechanical age. So many mechanical devices are now a part of the ordinary farm and home equipment that elementary training in machine shop practice is essential. The ever-increasing use of machinery in offices, factories, transportation, construction and all other branches of industry makes the machine shop unit the most important part of the general shop.

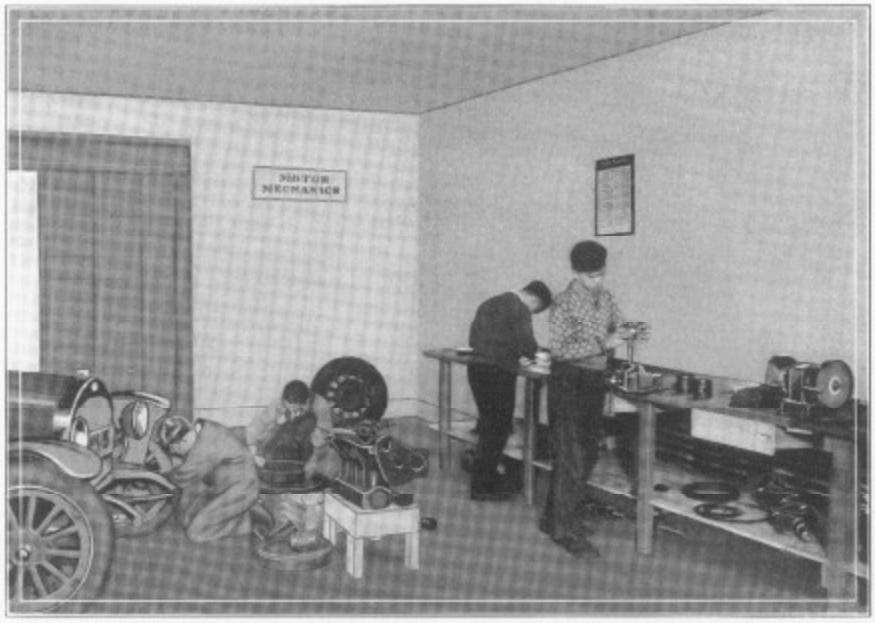
Operations Performed

1—Sharpen center punch or cold chisel.
2—Measure and lay out work at bench.
3—Cut metal with cold chisel and hack saw.
4—File and draw-file.
5—Bend and shape.
6—Drill and hand tap.
7—Sharpen drills correctly.
8—Drill small holes in thin metal.
9—Drill holes in thick metal.
10—Sharpen lathe tools.
11—Find center of stock—mark and drill center hole.
12—Mount work on centers and set lathe tool to correct position.
13—Turn, face and bore to dimensions.
14—Machine cast iron.
15—Machine steel.
16—Machine brass.
17—Turn tapers.
18—Knurl in the lathe.
19—Cut internal and external threads.

Related Knowledge

1—How to read a scale up to and including 64ths.
2—The use of the micrometer for measurements accurate to .001".
3—Decimal equivalents of fractional parts of an inch and how to use them.
4—How drills are dimensioned.
5—Sizes and kinds of common bolts, nuts, screws and pins.
6—Grades and uses of emery cloth.
7—Reasons for various finishes on metal and methods of applying.
8—Names of not less than 10 common metal working tools.
9—Reading of working-drawings of projects made in the machine shop.
10—Names of various operations in metal work; turning, facing, etc.
11—Various kinds of metals, their uses and how distinguished.
12—Elementary heat treatment of steel.
13—Laced and glued belts joints.

Reference Book and Projects for the Machine Shop Unit—See Pages 16 and 17.
For prices on Machine Shop Equipment refer to pages 12 and 13



Motor Mechanics' Unit in the Small General Shop

Motor Mechanics Unit of the General Shop

The motor mechanics section of the General Shop is devoted to instruction in the care and upkeep of automobiles, buses, trucks, tractors and farm stationary engines. Old automobiles for demonstration and practice work can be obtained from dealers at nominal cost. Some of the more important units such as the motor, transmission, axle assembly and differential can be cleaned and mounted on stands for study.

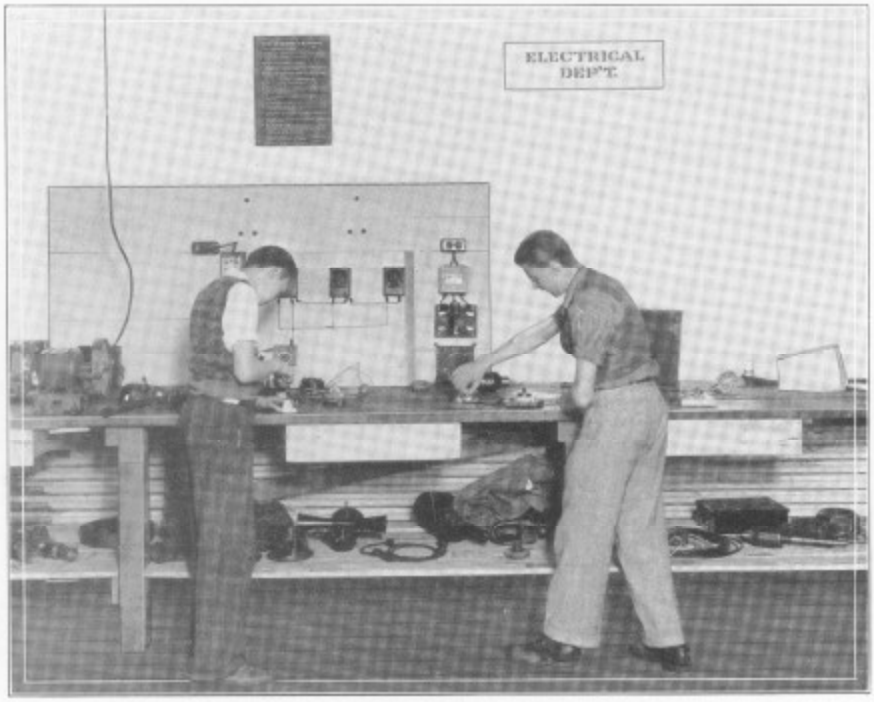
Operations Performed

1—Adjust tension on fan belt.
2—Remove and replace tire on two standard makes of wheels.
3—Repair puncture with a cold patch.
4—Repair puncture with a hot patch.
5—Block up a car.
6—Remove front wheels, replace, and adjust.
7—Clean and adjust breaker-points.
8—Replace blowout-boot in casing.
9—Wire a car from a chart.
10—Run motor after finishing the work.
11—Adjust brakes.
12—Dismantle and assemble rear spring.
13—Remove and replace radiator and fan.
14—Adjust front wheels for toe-in and alignment.
15—Remove and replace valves; reface and lap at least one intake and one exhaust valve.

Related Knowledge

1—Function and parts of the cooling system.
2—Methods of circulating cooling mediums.
3—Name, location, and functions of the main units of a car.
4—General construction of the main units of a car.
5—Chief parts of the front end of car.
6—Function of the differential.
7—What an internal and what an external brake is.
8—Function of the transmission.
9—Why a universal is needed in a car.
10—Necessity for proper inflation of tires.
11—Methods of circulating oil.
12—General safety precautions in driving.
13—Various kinds of wheel construction.
14—Main parts, and general functions of the parts of a rear end.
15—Principles of carburetion.

Reference Book and Projects for the Motor Mechanics' Unit—See Pages 18 and 19.
For prices on Motor Mechanics' Equipment refer to pages 12 and 13



Electrical Unit in a Small General Shop

Electrical Unit of the General Shop

The ever-increasing use of electricity in homes, business, industry, transportation and communication, and the fact that so many people are employed in work requiring some knowledge of the fundamentals of electricity, makes general instruction in this subject essential. All electrical work should be accompanied by discussions and carefully selected readings on the principles of electricity involved.

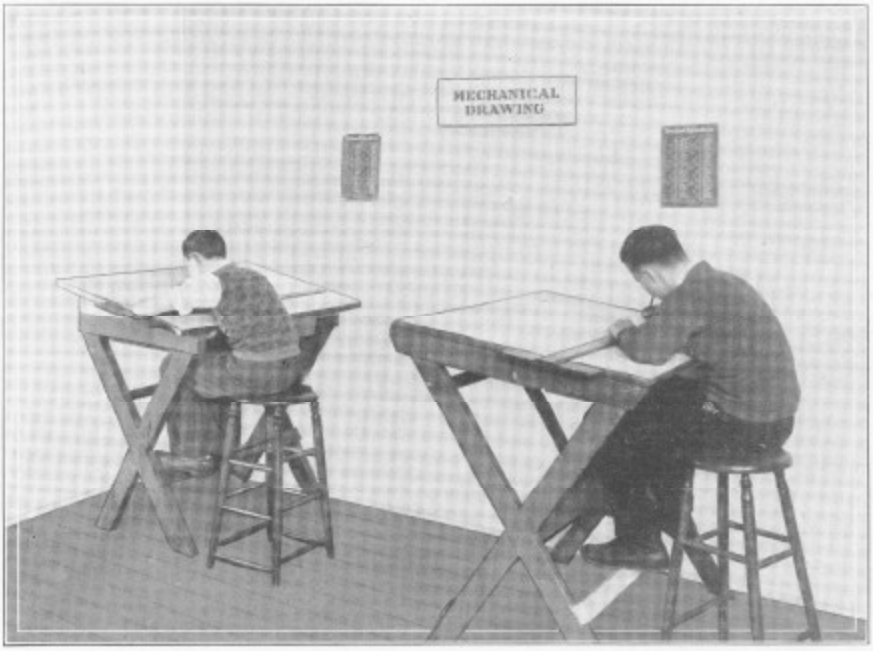
Operations Performed

1—Connect set of dry-cells in parallel.
2—Connect set of dry-cells in series.
3—Construct an electro-magnet.
4—Make common wire splices.
5—Solder and tape splices.
6—Construct simple bell circuit.
7—Construct bell circuit, using one button and two bells in parallel.
8—Construct bell circuit, using one button and two bells in series.
9—Construct circuit using one bell to operate from two push-buttons.
10—Construct an extension cord, 110-V.
11—Connect socket and plug.
12—Detect and remove trouble in bell circuit.
13—Assemble electric iron, heater, or toaster plug.
14—Construct circuit in which one button operates a bell and the other button operates a buzzer.

Related Knowledge

1—Sources of electrical current.
2—General nature of electricity.
3—What are conductors and non-conductors of electricity.
4—Principles of connecting dry-cells.
5—Why splices should be soldered.
6—Cause and effect of short circuits.
7—Use of extension cords.
8—Use of socket and plug.
9—Use of fuses.
10—Structure of a push-button.
11—Structure of an electric bell.
12—Uses of common electrical household appliances.
13—How to read the electric service meter.
14—Principles of electro-magnetism.
15—Uses of various common splices.
16—Dangers of electricity.
17—How to avoid the dangers of electricity

Reference Book and Projects for the Electrical Unit—See Pages 18 and 19.
For prices on Electrical Equipment refer to pages 12 and 13



Mechanical Drawing Unit of a Small General Shop

Mechanical Drawing Unit of the General Shop

Mechanical drawing is related to the General Shop because it is necessary for the boy who intends to follow any of the mechanical trades to be familiar with drawing. Industry considers mechanical drawing a trade, rather than a profession, because there are a great many mechanical draftsmen employed in factories who have not had the advantage of an engineering course. The work of many of these non-engineering draftsmen will compare favorably with that of the engineering draftsmen.

Mechanical drawing may be considered as related work in each section of the General Shop. Some of the projects that the boy is to make in the shop may first be drawn or sketched in the mechanical drawing unit. This will familiarize the boy with the work he is about to do, and it will also impress upon him the necessity of making his drawings accurately.

Work Done

1—Simple two view drawings of objects in horizontal and vertical lines with all edges visible.

2—Drawings involving invisible edges in two or three views.

3—Simple working-drawings involving inclined lines.

4—Simple working - drawings involving circles.

5—Working - drawings involving simple tangents.

6—Practical shop problems or projects involving principles introduced in preceding work.

Related Knowledge

1—Correct methods for sharpening drawing pencils, ruling pens, etc.

2—Correct use of drawing instruments.

3—Various types of lines and symbols used in mechanical drawing.

4—Symbols and specifications used in representing machine parts.

5—Symbols and specifications used in electrical wiring diagrams.

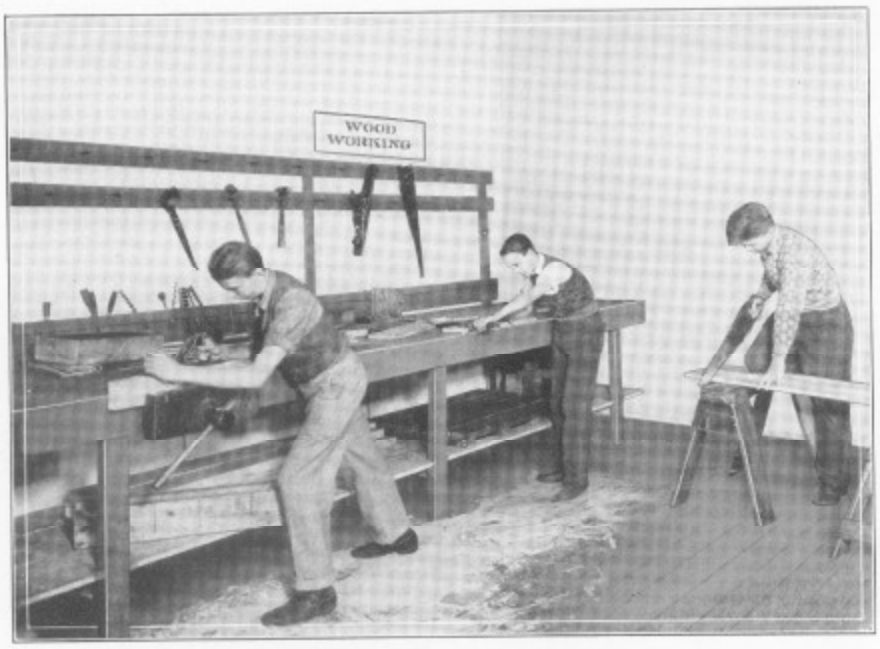
6—Symbols and specifications used in architectural drawings.

7—Principles of orthographic projection.

8—The interpretation of blue prints.

9—Appreciation of good design in furniture, machinery, buildings, etc.

Reference Book and Problems for the Mechanical Drawing Unit—See Pages 20 and 21.
For prices on Mechanical Drawing Equipment refer to pages 12 and 13



Woodworking Unit in a Small General Shop

Woodworking Unit of the General Shop

The woodworking unit affords remarkable possibilities as a practical educational department. It may include instruction in carpentry, cabinet making, wood finishing, polishing, concrete forms, etc. Wood turning is done in many shops on the Back-Geared Screw-Cutting Lathe equipped with wood turning hand rest, cup center and spur centers. By this method only one lathe is required.

Operations Performed

1—Sharpen cutting tools, using cutting wheel and sharpening stones.
2—Set up and operate plane.
3—Set and use marking-gauge.
4—Square a board of soft wood to three dimensions.
5—Insert blade in coping-saw and use properly.
6—Use sandpaper correctly, with block and without block.
7—Use hammer correctly for driving and pulling nails.
8—Bore for screws, and drive with common screw driver.
9—Apply stain, shellac, paint and wax.
10—Set and use the bevel.
11—Test with try-square for straightness and squareness.
12—Use cross-cut saw; general use and in miter-box.
13—Use rip-saw; ripping in vise and on horse.

Related Knowledge

1—How to read a rule up to and including 16ths.
2—How auger-bits are dimensioned.
3—Common wood fasteners; corrugated, brackets, nails, screws.
4—Sizes and kinds of common, casing, and finishing nails, and brads.
5—How to specify sizes of screws; flat, round-head.
6—Names of not less than 15 common woodworking tools.
7—Grades and uses of sandpaper.
8—Types of glue suitable for different work in wood.
9—Names of joints; butt, half-lap, mortise-and-tenon, dovetail.
10—Reasons for painting and wood finishing.
11—Read simple working-drawings for furniture, framework.
12—How lumber is made from logs.

Reference Book and Projects for the Woodworking Unit—See Pages 20 and 21.
For prices on Wood Working Equipment refer to pages 12 and 13

Forging Unit in a Small General Shop

Forging and Heat Treating Unit of the General Shop

Forging is desirable in the rural school shop because there are many repair jobs on farm implements, trucks, tractors and automobiles requiring some forge work.

The forge will also be found convenient for hardening and tempering center punches, chisels and other similar articles made in the machine shop unit.

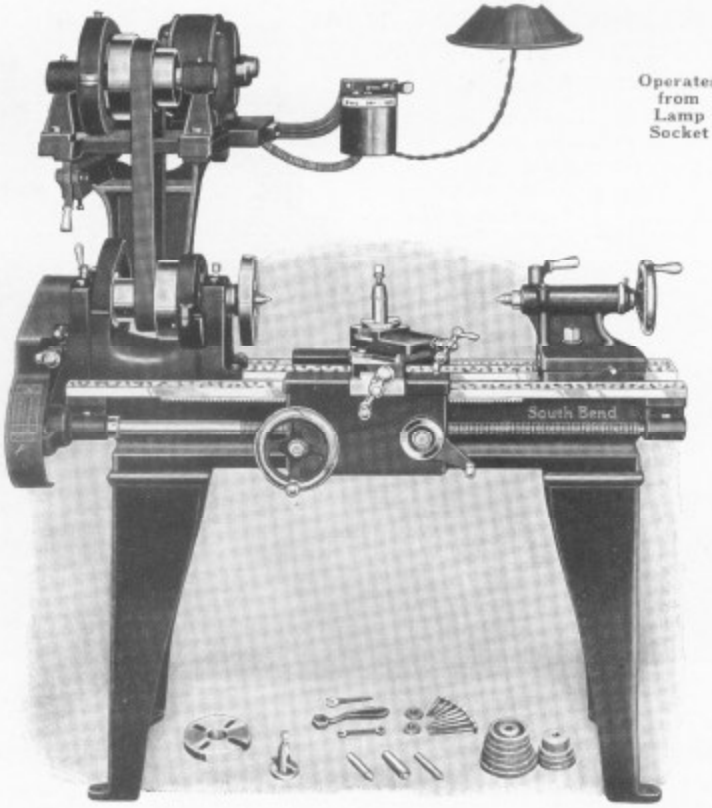
Operations Performed

1—Build and maintain fire in forge.
2—Heat and hold work in tong.
3—Measure and cut stock.
4—Draw out stock.
5—Bend round and rectangular stock.
6—Bend eyes.
7—Twist.
8—Upset, head and punch.
9—Form punched eye.
10—Fullering, swaging and striking.
11—Welding.
12—Forge tool steel.
13—Anneal tool steel.
14—Harden and temper tool steel.
15—Harden and temper high speed steel.
16—Case harden.
17—Harden and anneal brass and copper.

Related Knowledge

1—Location of forge shop equipment.
2—Name and use of all tools used in ordinary forging.
3—Shapes and sizes of wrought iron, mild steel and tool steel.
4—Expansion of iron and steel.
5—Various kinds of steel and iron, their texture and uses.
6—Fundamental principles of heat treating, iron and steel.
7—Various methods for finishing iron and steel.
8—Kind of fuel required for forge.
9—Spark test for determining various kinds of metals.
10—How to determine critical temperature of steel.
11—Welding fluxes and case hardening materials.

Reference Book and Projects for Forging, Tempering, Etc.—See Pages 20 and 21.
For prices on Forging Equipment refer to pages 12 and 13



9-in. Junior New Model Silent Chain Motor Driven Lathe

Back-Geared, Screw-Cutting Precision Lathe (Floor Leg Type)

The 9" Junior New Model South Bend Back-Geared Screw-Cutting Lathe is the same as the lathe shown in the General Shop on pages 2 and 4. This lathe is recommended for the General Shop, because it is used in industrial and manufacturing plants for the machining of all kinds of metal. In addition to its use in the machine shop unit of the General Shop, it is frequently used by the motor mechanics unit and the electrical unit for making replacement parts, winding electrical coils, truing worn and damaged parts and for making various tests. The lathe is also used in many shops by the woodworking unit for instruction in wood turning.

When Ordering the Lathe be sure to give specifications of electric current.

Operates from Lamp Socket. A ¼ H.P. reversing motor driven from an electric lamp socket gives sufficient power to operate the 9" Junior Motor Driven Lathe at maximum capacity. Operating cost averages two cents per hour.

Electrical Equipment included in the price of each 9" Junior Silent Chain Motor Driven Lathe consists of a ¼ H.P. Reversing Motor 1200 R.P.M. (Westinghouse, General Electric or equal make), Reversing Switch (Drum Type), wiring between motor and switch, Flexible Metal Conduit, Wiring Diagram, and a flat Leather Belt.

Lathe Equipment included in the price of each 9" Junior Silent Chain Motor Driven Lathe consists of: Face Plate, Tool Post Complete, Two Lathe Centers and Spindle Sleeve, Change Gears for thread cutting, Lag Screws, Washers and Wrenches, also installation Plans and books, "How to Run a Lathe" and "Auto Mechanics" Service Book."

For More Complete Description of the lathe send for Junior Catalog No. 22-C, which illustrates, describes and prices the 9" Junior New Model South Bend Lathe with various types of drives, also a complete line of attachments, accessories, chucks and tools.

Net Factory Prices of 9" Junior Silent Chain Motor Driven Lathe with Floor Legs

Prices Include Lathe Equipment, ¼ H.P. Reversing Motor, Reversing Switch and Belts

No. of Lathe	Swing Over Bed	Length of Bed	Between Centers	Size of Motor	Weight Crated	Code Word	3 Phase 60 Cycle A.C. Motor	Single Phase 60 Cycle A.C. Motor	Direct Current Motor
322-YN	9¼ in.	3 ft.	16⅝ in.	¼ H.P.	650 lbs.	Borno	**$283.00**	**$298.00**	**$291.00**
322-ZN	9¼ in.	3½ ft.	21⅝ in.	¼ H.P.	670 lbs.	Bosal	**289.00**	**304.00**	**297.00**
322-AN	9¼ in.	4 ft.	27⅝ in.	¼ H.P.	690 lbs.	Bospo	**296.00**	**311.00**	**304.00**
322-RN	9¼ in.	4½ ft.	34⅝ in.	¼ H.P.	710 lbs.	Botam	**304.00**	**319.00**	**312.00**

If Bench Legs are wanted instead of Floor Legs deduct **$7.50**

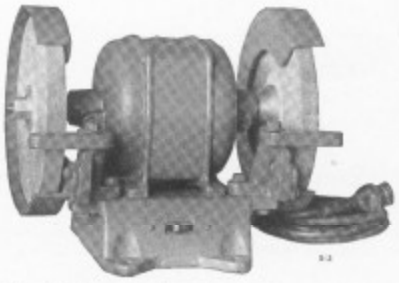
Equipment for the Small General Shop

10-in. Motor Drive Bench Drill

The 10" bench drill illustrated at the right is the same as is shown in the machine shop unit of the General Shop on pages 2 to 4. It drills up to ⅜" diameter hole to the center of a 10" circle. The spindle speeds are 720, 1,430 and 3,000 R.P.M. Up and down run of spindle, 2½". Up and down run of table, 7". Greatest distance between spindle and table, 9". Diameter of table, 8".

This drill comes fully equipped with ¼ H.P. 110-volt, 60-cycle, single phase vertical type motor, toggle type switch, extension cord and socket, 1" endless leather belt and chuck. All parts are accurately machined and pulleys are balanced for high speed. The spindle is equipped with ball bearing thrust, and an adjustment is provided for the correct belt tension. Net weight, 93 pounds. Complete description on request. Price f.o.b. Chicago, Ill. **$47.00.**

10-inch Motor Drive Bench Drill



8-inch Motor Drive Bench Emery Grinder

8-in. Motor Drive Bench Emery Grinder

This is the same grinder as is shown in the General Shop equipment on pages 2, 5 and 6. It comes fully equipped with two ¾"x8" grinding wheels—one fine and one coarse, extension cord, plug and switch. Wheel guards and adjustable tool rests are also furnished. The 1/3 H.P. 110-volt, 60-cycle, single phase motor has a speed of 1,800 R.P.M. and is equipped with dust proof bearings. Over all dimensions 11" high by 13" wide. Shipping weight, 68 pounds. Complete description on request. Price f.o.b. Chicago, Ill. **$35.00.**

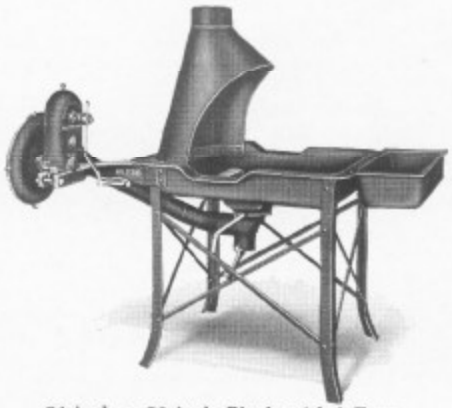
24-in. x 30-in. Blacksmiths' Forge

Hand Power Blower

This forge is illustrated in the forging and heat treating unit of the General Shop on pages 2 and 9. It has an improved one-piece all steel hearth made from a heavy gauge of plate, having no sharp corners to collect moisture or rust and no joints to come apart. The legs are made of heavy angle iron and cross-braced effectively with heavy strap iron.

The blower has a two-piece all steel scroll shape fan housing 12" in diameter. It is light weight, easy running and provides a strong blast. The gear ratio is 47½ to 1.

Size of hearth 24"x30"x3" deep. Hearth has broad turned over brim which strengthens the entire forge and serves as a convenient tool rest. Shipping weight, 150 pounds. Complete description on request. Price f.o.b. Buffalo, N. Y. **$37.50.**



24-inch x 30-inch Blacksmiths' Forge

Equipment for the Small General Shop

Consisting of Machinery, Hand Tools and Accessories

The total cost of the equipment required for a small General Shop depends on the type of equipment selected, the units included in the General Shop and the number of boys taken care of at one time. We have estimated the minimum cost of equipment for a small General Shop to take care of 15 or more boys per period.

The general machine equipment consists of a back-geared screw-cutting lathe, a bench drill press, a bench grinder and a forge, as illustrated and described on pages 10 and 11. These machines are used by all units of the shop in teaching the fundamentals of the various trades as shown on pages 2 to 11 inclusive.

Cost of Equipment

Machine Equipment

	Prices
1—9"x4' **Junior New Model South Bend Lathe,** Silent Chain Motor Driven Floor Leg Type as shown in the machine shop unit of the General Shop on pages 2 and 4. (See page 10 for illustration and description). Net factory price f.o.b. South Bend, Indiana	$311.00*
1—10" **Bench Motor Drive Drill Press** as shown in the machine shop unit of the General Shop on pages 2 and 4. (See page 11 for illustration and description). Net factory price f.o.b. Chicago, Illinois	47.00*
1—8" **Bench Motor Drive Emery Grinder** as shown in the General Shop equipment on pages 5 and 6. (See page 11 for illustration and description). Net factory price f.o.b. Chicago, Illinois	35.00*
1—**Hand Power Forge** as shown in the General Shop equipment on pages 2 and 9. (See page 11 for illustration and description). Net factory price f.o.b. Buffalo, New York	37.50

Hand Tool and Accessory Equipment

See Page 13 for Itemized List of Tools

No. 1—Equipment for Use of Entire Shop — General Hand Tool Equipment and Accessories, as listed on page 13	$ 58.00
No. 2—Equipment for Machine Work Unit—Hand Tool Equipment and Accessories, as listed on page 13	100.00
No. 3—Equipment for Motor Mechanics Unit—Hand Tool Equipment and Accessories, as listed on page 13	50.00
No. 4—Equipment for Electrical Unit—Hand Tool Equipment and Accessories, as listed on page 13	60.00
No. 5—Equipment for Mechanical Drawing Unit — Hand Tool Equipment and Accessories, as listed on page 13	50.00
No. 6—Equipment for Woodworking Unit—Hand Tool Equipment and Accessories, as listed on page 13	100.00
No. 7—Equipment for Forging Unit—Hand Tool Equipment and Accessories, as listed on page 13	40.00
Total Cost of Entire Equipment including Machine Equipment and Hand Tool and Accessory Equipment	$888.50

*Prices are for machines equipped with 110-volt, 60-cycle, single phase individual motor drive. Prices for machines equipped with motors of other current ratings, or with countershaft drive, furnished on request.

Itemized List of Hand Tool and Accessory Equipment

As listed on page 12 under "Cost of Equipment"

GENERAL EQUIPMENT FOR USE OF ALL SHOP UNITS

In addition to the lathe, drill press, forge and grinder listed on pages 10, 11 and 12, an assortment of small hand tools and accessories will be required consisting of Equipment No. 1 listed below. This general equipment is used in common by all units of the shop and may be kept in the tool room, if desired.

No. 1—Equipment for Use of Entire General Shop

Equipment for 15 or more boys at one time:

1—short set jobbers' drills with metal base, 1/16" to ½" by 32nds; 1 tap and die set for U.S.S. and S.A.E. threads ¼" to ½" by 8ths; 1—6" adj. crescent end wrench; 1—6" combination pliers; 3—1 lb. ball peen machinists' hammers; 1—½ lb. ball peen, machinist's hammer; 1—1/3 pt. oil can; 6—No. 2 file handles; 6—10" 2nd cut mill files; 1—6" round file; 1—10" round file; 1—emery wheel dresser; 1—file card; 1—½" cold chisel, 1—4" outside calipers; 1—4" inside calipers; 1—4" dividers; 1—scribe; 1—9" combination square No. 11; 1—6" steel scale. No. 4 graduations; 1—3" screw driver; 1—6" screw driver; 1—center punch; 2—sheets emery cloth; 1—bench brush; 2—light weight "C" clamps; 1—set steel figures, 3/32" high; 1—pair goggles; 1—10" hacksaw; 1—doz. hacksaw blades all hard, 24 teeth; 1—try square; 1—10" monkey wrench. Total cost **$58.00.**

ADDITIONAL EQUIPMENTS FOR SHOP UNITS

Each individual unit of the General Shop, such as the machine shop unit, motor mechanics unit, etc., also require an assortment of small hand tools and accessories not included in the No. 1 Equipment listed above. These equipments are listed below under No. 2, No. 3, etc., for each individual unit of the General Shop.

No. 2—Equipment for Machine Work Unit

Equipment to take care of 4 boys at one time:

3—3" machinist's vises; 1—No. 2406, 6" 3-jaw universal geared scroll lathe chuck with 2 sets of jaws; fitting chuck to lathe, including semi-machined chuck-back; 1—No. 1201 3-jaw drill chuck, ½" capacity; 1—No. 709 drill chuck arbor, fitted; 1—No. 849-R right hand patent turning tool; 6—No. 1419 high speed cutter bits (not ground to shape); 1—No. 429 patent boring tool, style B; 1—No. 881-S patent cutting off tool (straight); 1—No. 891 knurling tool with medium diamond knurls; 1—set (3) safety lathe dogs, ½", ¾", 1"; 1—No. 650 center gauge; 3—No. 898-B combination center drill and countersink. Total cost **$100.00.**

No. 3—Equip. for Motor Mechanic's Unit

Equipment to take care of 5 boys at one time:

2—sets wrenches (including both socket and end wrenches); 1—set ignition wrenches; 1—chain hoist, 2,000 lbs.; 2—jacks; 1—12" monkey wrench; 1—18" Stillson wrench; 1—thickness gauge; 1—inside micrometer; 1—6 lb. sledge; 1—12" screw driver; 2—8" screw drivers; 1—6" screw driver; 2—valve lifters; 1—grease gun outfit. Total cost **$50.00.**

Equipment for motor mechanics unit should also include: two sets of old car parts, which can be purchased from any local car wrecking depot; and a wooden bench which should be made in the school shop.

No. 4—Equipment for Electrical Unit

Equipment to take care of 5 boys at one time:

2 light sockets, 2 bells, 2 push buttons, one 2-way switch, one 3-way switch, two 25-watt bulbs; assortment of wire (including cotton covered and twin pair); 4—6" pliers (including side-cutting and square-nose types) 2—snips; 2—8" screw drivers (wood handles); 2—6" screw drivers (wood handles); 2—2" screw drivers (wood handles); 1—claw hammer, 10 ounces; 1—2-foot rule (24" straight rule); 1—voltmeter; 1—Tungar rectifier; 2—small transformers; 12—auto light bulbs: soldering equipment; several Christmas tree lights. Total cost **$60.00.**

Equipment for electrical unit should also include 5 wiring boards; coils, starters, generators, ammeters, and other parts of auto system. The electrical parts can be secured from junked cars. The wiring boards should be made in the school shop.

No. 5—Equip. for Mechanical Drawing Unit

Equipment to take care of 4 boys at one time:

4—architect's scales; 4—sets drawing instruments; 4—T squares 24"; 4—scales (graduated); 4—30°-60° triangles; 4—45° triangles; blue print equipment; printing frame; blue print paper; tracing paper and cloth. Total cost **$50.00.**

Equipment for mechanical drawing unit should also include 4—drafting boards 18"x24", and a washing tray for blue prints. These items should be made in the school shop.

No. 6—Equipment for Woodworking Unit

Equipment to take care of 5 boys at one time:

1—wood turning attachment (for 9" South Bend Lathe listed with General Machine Equipment) consisting of 1—hand rest, 1—spur center and 1—cup center); 4—22" to 26" saws; 1—10 point crosscut; 1—8 point crosscut; 1—6 point ripsaw; 1—14" keyhole saw; 1—coping saw; 2—steel squares; 1—18" foreplane; 1—14" jack plane; 4—9" smooth planes; 2—7" block planes; 1—8" drawknife; 10—wood chisels, 2—1¼"; 2—1", 2—¾", 2—½", 1—⅜" and 1—¼"; 2—cold chisels; 2—ratchet braces; 1—set auger bits (1/16" to 1", 13 in number); 1—saw set; 1—saw vise; 2—mill files; 6 assorted screw drivers; 2—marking gauges; 1—butt gauge; 1—glass cutter; 2—putty knives; 4—claw hammers; 1—shingling hatchet; 6 nail sets; 1—carborundum stone; 1—oil can; 4—6" try squares; 2—6" dividers; 2—T bevels, 1—50' steel tape; 4—6' folding rules; 1—spoke shave; 4—wood clamps; 2—pairs iron beam clamps, 4'; 1—wrecking bar; 4 chalk lines; 1—dozen cakes carpenter's chalk; 1—monkey wrench; 1—pair tin snips; 3—levels; 1—vise for carpenter's bench. Total cost **$100.00.**

Equipment for woodworking unit should also include 1—carpenter's bench; 2—6" straight edges; and 3—pairs saw horses. These items should be made in the school shop.

No. 7—Equipment for Forging Unit

Equipment to take care of 3 boys at one time:

1—100 lb. anvil; 1—4" machinist's vise; 1—pair tongs; straight lips; 1—pair tongs, curved lips; 1—2 lb. ball peen hammer; 1—2 lb. cross peen hammer; 1—sledge hammer. Total cost **$40.00.**

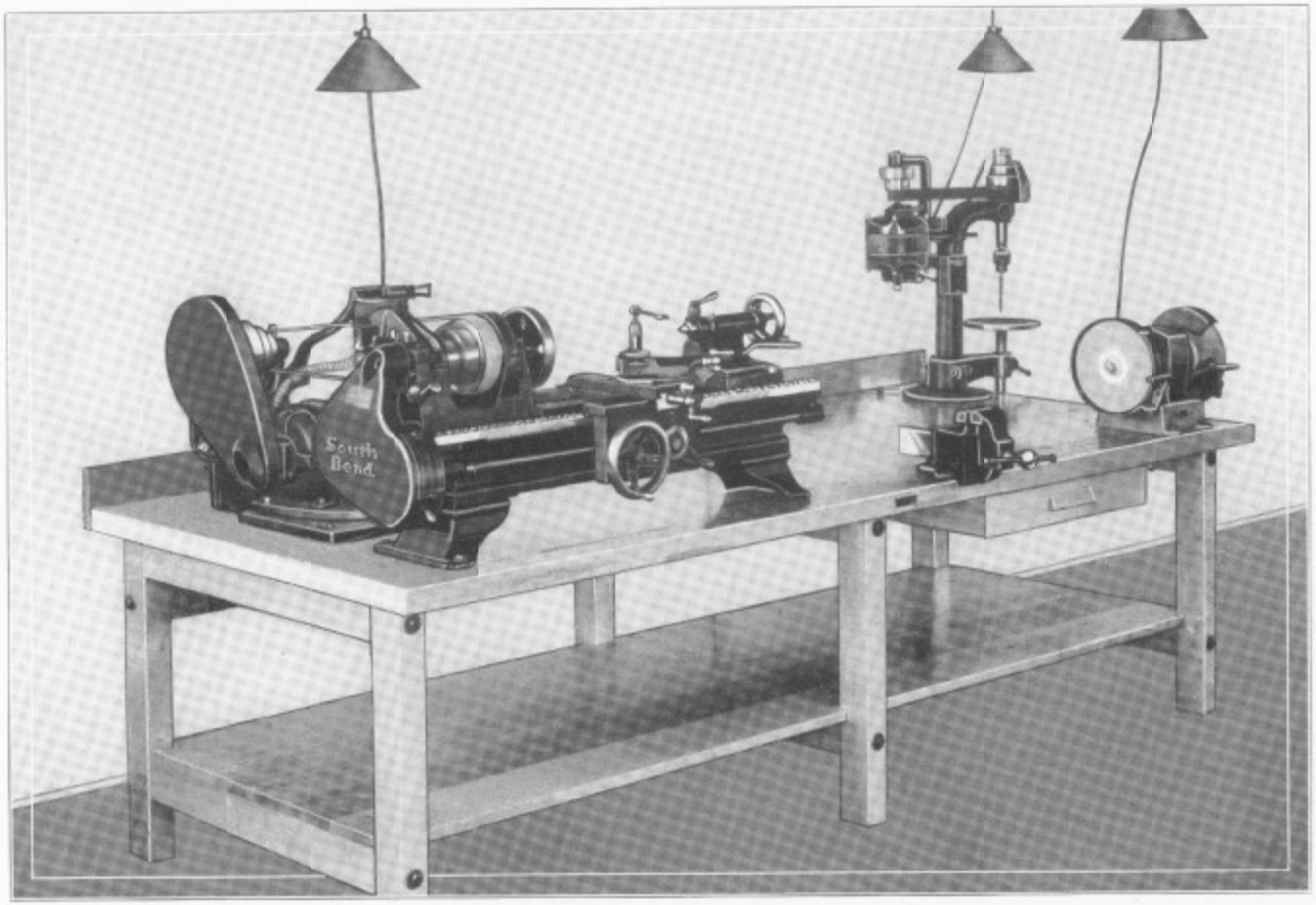
Equipment for forging unit should also include 1—shovel and 1—poker. These items should be made in the school shop.

Wood Benches for the General Shop

Prices shown on pages 12 and 13 do not include wood benches, drawing boards, saw horses, etc., all of which can be made in the school shop.

We can supply drawings for wooden benches, mechanical drawing tables, wiring boards for the electrical shop, etc., giving complete construction and working details. Blue prints will be mailed to any instructor, no charge, on request.

Most shops build their own benches. However, if it is more desirable to purchase ready made benches, we shall be pleased to furnish complete information and prices on request.



BENCH MOTOR DRIVEN MACHINE UNIT FOR THE GENERAL SHOP

A complete self-contained machine shop equipment unit consisting of individual motor driven machines mounted on one bench. Price as illustrated but without bench, $369.00

Bench Motor Driven Machine Unit

For the General Shop

The bench motor driven machine unit, illustrated on the opposite page, is a complete self-contained machine shop equipment consisting of an individual motor driven lathe, drill and grinder mounted on a substantial wood bench. A three inch machinists' vise is also included in the equipment.

9-in. x 4-ft. Junior Bench Lathe

The 9"x4' Junior New Model South Bend Back-Geared Screw-Cutting Bench Lathe is the same as the lathe shown in the General Shop views on pages 2 and 4 and illustrated and described on page 10 except that it is equipped with the Self-Contained "V"-Belt motor drive instead of the Silent Chain motor drive and bench legs instead of floor legs. It will operate from an ordinary electric lamp socket at an average cost of about 2 cents per hour. The Self-Contained "V"-Belt motor drive is an improved and efficient safety drive that is noiseless and powerful in operation.

The Self-Contained "V"-Belt Motor Drive Unit with a ¼ H. P. Reversing Motor is placed directly behind the lathe on the bench where it is free from dirt and chips. Power is delivered from the motor to the driving cone through a silent "V"-Belt and then by flat leather belt to the lathe cone pulley. Both motor and driving cone have machined "V"-Belt Pulleys. The base on which the motor rests is arranged to permit belt adjustments. A flexible conduit encases all wiring.

A Reversing Switch (Drum Type) conveniently located within easy reach of the operator, controls the motor and provides instantaneous starting, stopping and reversing of the lathe spindle. The switch has three positions: Left for forward motion of the lathe spindle; Center for stop; and Right for reverse.

The Electrical Equipment included with the drive unit for this lathe consists of: ¼ H. P. Constant Speed Reversing Motor, 1200 R. P. M.; Reversing Switch (Drum Type); Wiring Between Motor and Switch; Flexible Metal Conduit; Wiring Diagram; one flat Leather Belt and one "V"-Belt.

The Lathe Equipment included in the price consists of: Face Plate, Tool Post Complete, two Lathe Centers and Spindle Sleeve, Wrenches, Independent Change Gears, Bolts, Nuts and Washers. Also Installation Plans and Book, "How to Run a Lathe."

Price No. 7222-AN 9"x4' Junior Self-Contained "V"-Belt Motor Driven South Bend Bench Lathe with 110-Volt, 60-Cycle Single Phase A.C. ¼ H.P. Reversing Motor, 1200 R.P.M., and Lathe Equipment Listed above **$279.00** f.o.b. South Bend.

Note: This lathe is furnished in various bed lengths and for any electrical current specifications. Write for our Junior Catalog No. 22-C giving complete description and prices.

10-in. Motor Drive Bench Drill

The bench drill press is quite essential in the General Shop. It is used for drilling, tapping and reaming by the machine shop unit, the automotive unit and the electrical unit. The woodworking unit will also find it convenient from time to time where a number of small holes are to be drilled.

This drill press is equipped with a ¼ H.P. motor, extension cord, toggle type switch and drill chuck. Drills 0 to ⅜" holes to center of 10" circle. See page 11.

8-in. Motor Drive Bench Grinder

The bench grinder is used chiefly for sharpening tools used in the woodworking department, the machine shop unit and the motor mechanics unit.

The grinder illustrated is equipped with a 1/3 H.P. motor, extension cord, plug and switch. It has two grinding wheels, 8" in diameter by ¾" face, one fine and one coarse. Adjustable tool rests and guards are included. See page 11.

3-in. Machinist's Vise

This is a standard 3" machinist's vise which is strong and durable. Jaws are lined with hardened steel plates. The vise is provided with three holes for bolting to the work bench. Base is plain. The jaws are 3" wide, maximum opening is 4½". Price f.o.b. Cleveland, Ohio, **$8.00.**

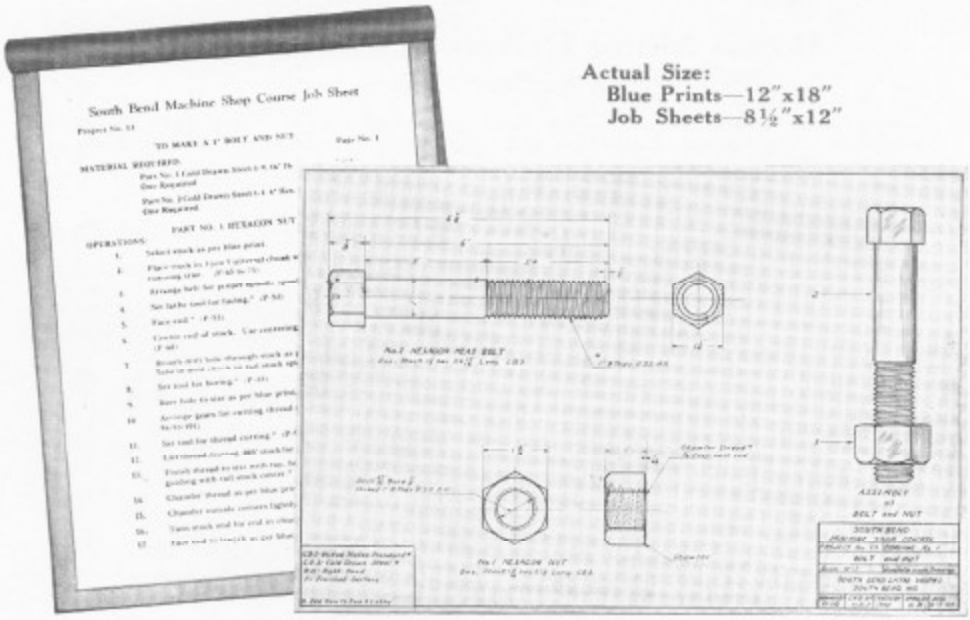
Wood Bench

The bench illustrated is 40 inches wide and 96 inches long. It is substantially constructed of hard maple and has natural wood shellac finish. Price is shown below.

The bench is shipped knocked down to save freight charges. Bolts are furnished for assembling. If you wish to make your own bench, we will supply blue prints of detailed drawings free of charge. Price of hard maple wood bench 40" wide by 96" long, **$65.00.**

Total Price

The total price of the South Bend Bench Machine Unit including the 9"x4' Junior New Model South Bend Lathe with the unit motor drive, the 10" bench drill press with individual motor drive, the 8" bench emery grinder with individual motor drive and two grinding wheels, 3" machinist's vise but not bench is **$369.00** f.o.b. South Bend.



Actual Size:
Blue Prints—12"x18"
Job Sheets—8½"x12"

The South Bend Machine Shop Course
For Instruction in Machine Shop Practice

The South Bend Machine Shop Course was developed about 10 years ago and is now used by 3,000 schools in the United States and 26 other countries. Many industrial plants and railroad shops giving apprentice training also use this course. Mechanical drawing instructors use the blue prints for teaching modern drafting practice. By supplying each student with a duplicate copy, the instructor can introduce each step in the work by lectures. Correct procedure is then followed in the drawing room for shop.

The elementary projects illustrated are all practical and can be made in the small General Shop with the equipment listed in this bulletin. Upon request we will furnish any instructor a list of the projects which we can supply on any General Shop subject.

Drawings and Blue Prints

Drawings for this Course are made on standard size sheets 12 by 18 inches. Each part of the project is shown in detail on the blue print—also an assembly drawing. These drawings represent first class engineering practice and are used in many schools for instruction in mechanical drawing as well as in the shop.

Job Sheets for Each Project

Job Sheets 8½ by 12 inches, compiled in folio form, accompany the blue prints of each project. Job Sheets explain the work step by step from start to finish, following the methods used in modern Machine Shop Practice. A sample Job Sheet is illustrated above.

The South Bend Machine Shop Course
Described in Bulletin No. 55

This 16-page bulletin gives complete detailed information on the South Bend Machine Shop Course and prices of Blue Prints and Job Sheets, Rough Castings, Steel and Hardware parts for 57 machine shop projects. The projects in the course cover a wide range of machine shop work starting with simple elementary jobs and gradually advancing so that the more advanced projects require skill equal to that of the expert mechanic. The booklet will be mailed postpaid, no charge, to any supervisor or instructor on request.

Size 8"x10¾", 16 pages.

"How to Run a Lathe"

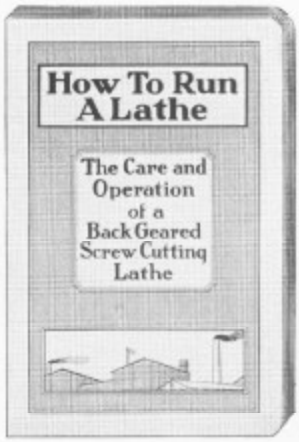
For Instruction in the Machine Shop Unit

"How to Run a Lathe" is an authoritative manual covering the fundamental operations of the modern screw-cutting lathe. It contains complete instructions on the setting up, the care and operation of the screw-cutting lathe.

This reference book is 5½x8", 160 pages. There are more than 1,250,000 in use throughout the world. Railroad shops and large industrial plants are supplying these books to their apprentices in their machine shops and more than 250,000 are used as text books in the shops of Vocational Schools, Trade and Engineering Schools. A copy of this book is included in the equipment of each South Bend Lathe. Revised edition No. 29.

Mailed anywhere in the world, postpaid, price 25c.

Coin or stamps of any country accepted.



Projects for the General Shop

With a well selected set of projects, the instructor can proceed very nicely in a general shop course. All problems are well worked out in the job sheets and blue prints.

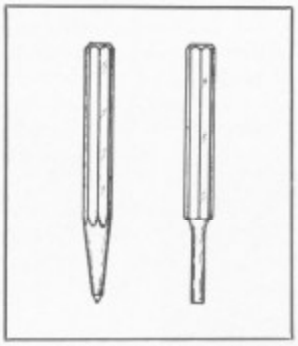
We have a series of projects or jobs on machine work, motor mechanics, electrical work, woodwork, forging and mechanical drawing.

Complete lists and prices of projects for any unit of the general shop will be furnished on request. See pages 17 and 19.

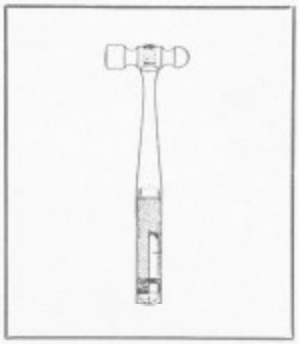
The seven elementary machine shop projects illustrated below are part of the 57 projects in the South Bend Machine Shop Course described on the preceding page.

Machine Shop Projects

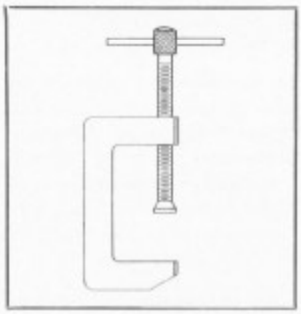
Project No. 3—Plumb Bob. 1 Blue Print, 2 Job Sheets, 35c. Steel and Hardware: Extra 10c.



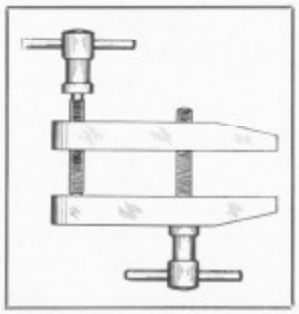
Project No. 2—Center Punch and Drift Punch—1 Blue Print, 2 Job Sheets, 35c. Steel and Hardware: Extra 15c.



Project No. 24 — Machinist's Hammer Kit—1 Blue Print, 4 Job Sheets, 55c. Steel and Hardware: Extra $1.40.



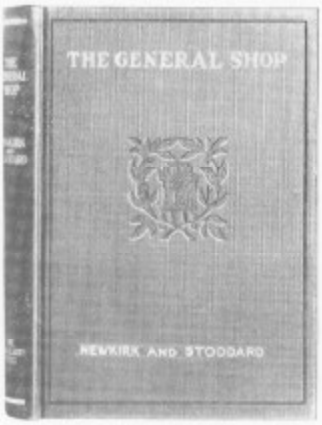
Project No. 18—"C" Clamp—1 Blue Print, 6 Job Sheets, 75c. Steel and Hardware Parts: Extra 30c.



Project No. 20 — Machinist's Clamp — 1 Blue Print, 4 Job Sheets, 55c. Steel and Hardware: Extra 50c.

Project No. 15 — Screwdriver, Steel—1 Blue Print, 4 Job Sheets, 55c. Steel and Hardware: Extra 20c.

Reference Books for the General Shop



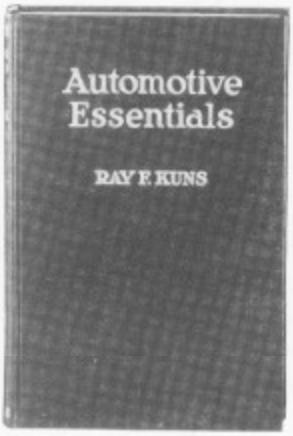
For Planning and Organizing a General Shop

"THE GENERAL SHOP"

By Newkirk and Stoddard

A thorough and illuminating discussion of the problems of organization and management of the General Shop, courses of study, equipment and method of teaching. Considers the relation of the General Shop to the educational program in the Junior and Senior High school, from the standpoint especially of the shop teacher on the job, the supervisor and the prospective teacher in training. Combines a very practical exposition of ways and means and methods, with a sound discussion of the underlying pedagogical basis for what is proposed.

Price postpaid **$2.00.**



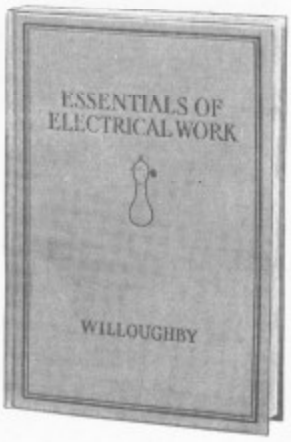
For Instruction in the Motor Mechanics' Unit

"AUTOMOTIVE ESSENTIALS"

By Ray F. Kuns

A basic text, designed to outline a carefully graded driver's course for students of high school age. The initial chapter deals with the car as a unit, describing in non-technical and interesting language the chassis, frame, front axle, steering gear, etc. Succeeding chapters break these units into their component parts, until each essential part has been illustrated and discussed. It equips the student to select, use, and repair automobiles intelligently. It is so arranged that it can be correlated with a science course. Altho-leather, 396 pages.

Price postpaid **$1.90.**



For Instruction in the Electrical Unit

"ESSENTIALS IN ELECTRICAL WORK"

By Willoughby.

This is a textbook which is intended as a guide to students in acquiring skill in the installation, operation, and upkeep of electrical conveniences found in the average home and business surroundings. It is of special value in a general course in applied electricity where construction can be carried on in conjunction with the practical phases of operation and repair. The book is divided into eight sections.

The Appendix contains wiring diagrams. Questions at end of each chapter constitute a real test of what the student knows on subject matter of given chapter.

Price postpaid **$1.60.**

Jobs for the Motor Mechanics Unit of the General Shop

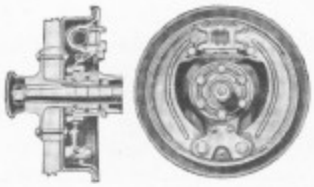


Figure 26. Adjustment of two-shoe internal expansion type brakes. Price: 1 Blue Print, 1 Job Sheet, **35c.**

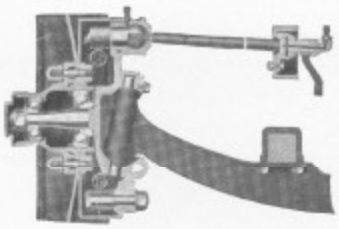


Figure 27. Checking front wheel assembly for alignment, camber, caster and toe-in. Price: 2 Blue Prints, 2 Job Sheets, **50c.**

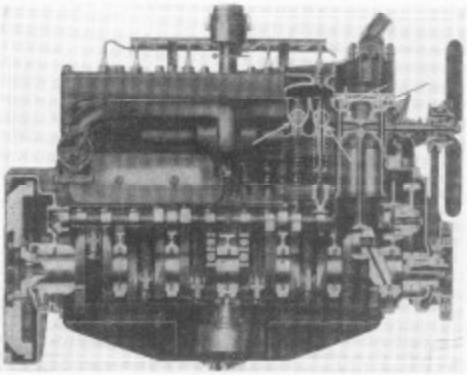


Figure 28. Wire the ignition system of motor from a chart and run the motor. Price: 2 Blue Prints, 2 Job Sheets, **50c.**

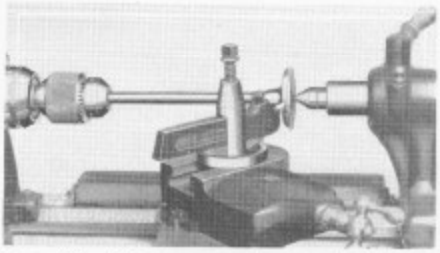


Figure 29. Refacing an exhaust valve by turning in the lathe. Price: 7 Blue Prints, 8 Job Sheets, **$1.85.**

Problems for the Electrical Unit of the General Shop

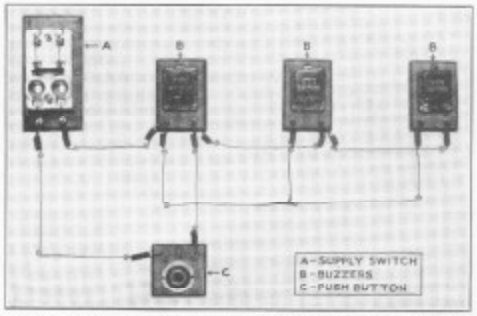


Figure 30. Wiring three buzzers to be operated by one push button. Price: 1 Blue Print, 2 Job Sheets, **35c.**

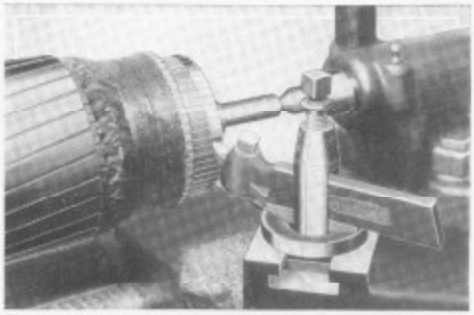


Figure 31. Truing an armature commutator in the lathe. Price: 3 Blue Prints, 4 Job Sheets, **85c.**

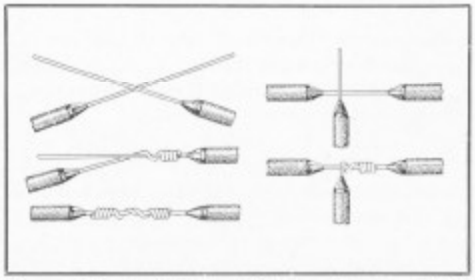


Figure 32. A Western Union splice and joint properly made. Price: 1 Blue Print, 1 Job Sheet, **25c.**

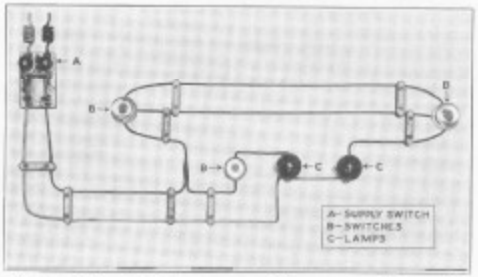
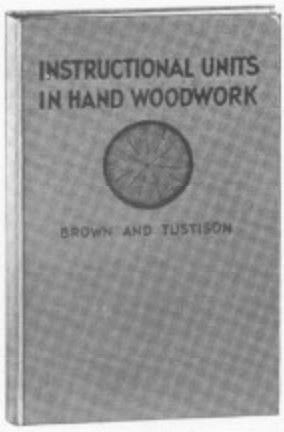


Figure 33. Using open wiring connections for the installation of two electric lights. Price: 1 Blue Print, 2 Job Sheets, **35c.**

Reference Books for the General Shop



For Instruction in the Woodworking Unit

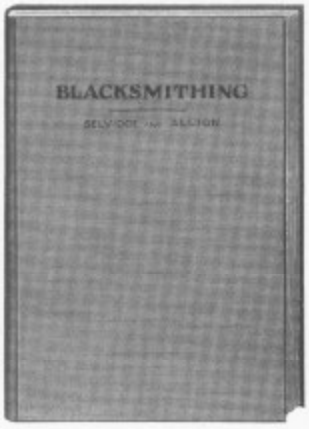
"INSTRUCTIONAL UNITS IN HAND WOODWORK"

By Brown and Tustison

"Instructional Units in Hand Woodwork" by A. G. Brown, Instructor in Woodwork, and F. E. Tustison, Head, Department Home Mechanics, Stout Institute, Menomine, Wisconsin.

This book provides a basic course in woodworking for the upper grades and for the Junior High school. It has been developed on the unit instruction sheet plan and covers the entire range of woodworking with special applications to the making of objects of boy interest, simple carpentry, and furniture making.

Price postpaid **$1.60.**



For Instruction in Forging and Heat-Treating

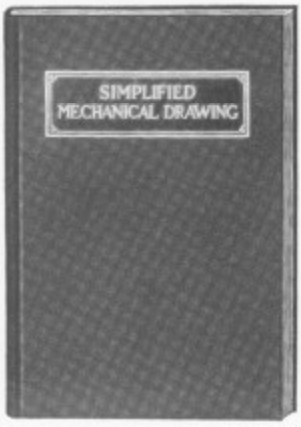
"BLACKSMITHING"

By Selvidge and Allton

"Blacksmithing" by R. W. Selvidge, Professor of Industrial Education, University of Missouri, and J. M. Allton, Instructor of Forging, University of Missouri.

This book is designed for use as a shopwork manual in school shops and farm shops. The material is organized in such a way as to give the utmost flexibility in teaching the subject. It is especially adapted to individual instruction, and thus fits the needs where the students represent differing stages of advancement; also where several subjects are taught to mature students in the same room and at the same time.

Price postpaid **$1.20.**



For Instruction in Mechanical Drawing

"SIMPLIFIED MECHANICAL DRAWING"

By Thurman C. Crook

"Simplified Mechanical Drawing" by Thurman C. Crook, Instructor in Mechanical Drawing, South Bend Central Junior High School and South Bend Vocational School.

A new book that presents a drawing course which gives, in clear and comprehensive language, full details and information concerning the reading, writing and understanding of the graphic language—mechanical drawing—as it is needed by the seventh, eighth, and ninth grade student. 155 pages, 9x6½", illustrated.

Price postpaid, **$1.25.**

Projects for the Woodworking Unit of the General Shop

Fig. 35—Hog Trough. A simple but useful and practical elementary woodworking project. Price: 1 Blue Print, 1 Job Sheets, **25c.**

Figure 36—Chicken Coop. A good project involving simple carpentry, including shingling, mitre joints, hinges, etc. Price: 1 Blue Print, 4 Job Sheets, **55c.**

Figure 37—Lawn Bench. This project is interesting, useful and ornamental. Price: 1 Blue Print, 2 Job Sheets, **35c.**

Projects for the Forging Unit of the General Shop

Figure 38—Cold Chisel. An excellent project giving experience in drawing and tempering. Price: 1 Blue Print, 2 Job Sheets, **35c.**

Figure 39—Chain Links. This project includes bending and welding operations. Price: 1 Blue Print, 2 Job Sheets, **35c.**

Figure 40—Small Fire Shovel. In making this project experience is gained in upsetting, bending, drawing, punching and riveting. Price: 1 Blue Print, 1 Job Sheet, **25c.**

Problems for the Mechanical Drawing Unit of the General Shop

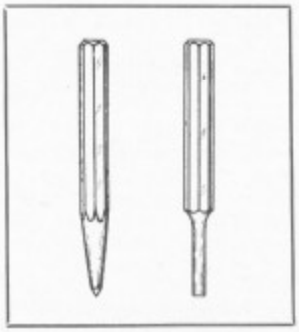


Figure 41—Center Punch and Drift Punch. Simple jobs for the beginner. Price: 1 Blue Print, 2 Job Sheets, **35c.**

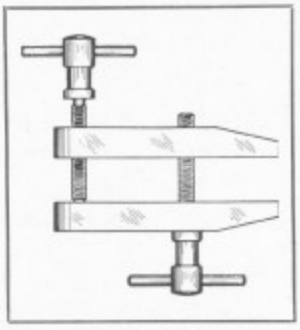
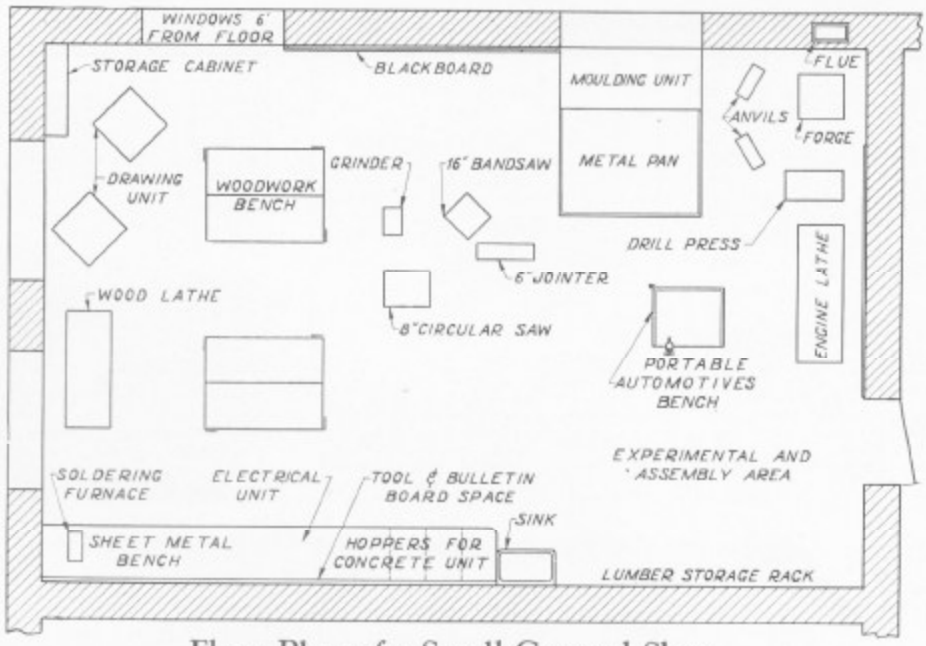


Figure 42—Machinist's Clamp. A problem including thread specifications, drill and tap sizes, etc. Price: 1 Blue Print, 2 Job Sheets, **35c.**

Figure 43—Screw Driver. This is a simple problem for the beginner in mechanical drawing. Price: 1 Blue Print, 2 Job Sheets, **35c.**



Floor Plan of a Small General Shop

Designed by PROFESSOR WILLIAM E. WARNER
Ohio State University, Columbus, Ohio

Shop teachers and public school officials are usually on the alert for new ideas and improved ways of equipping and teaching industrial arts work. The problem is unusually important and difficult for the small school and for the rural consolidated school. After considerable study of the problem, Dr. Warner proposed the above layout in connection with an extensive exhibit of such work at the Ohio State Fair in 1929.

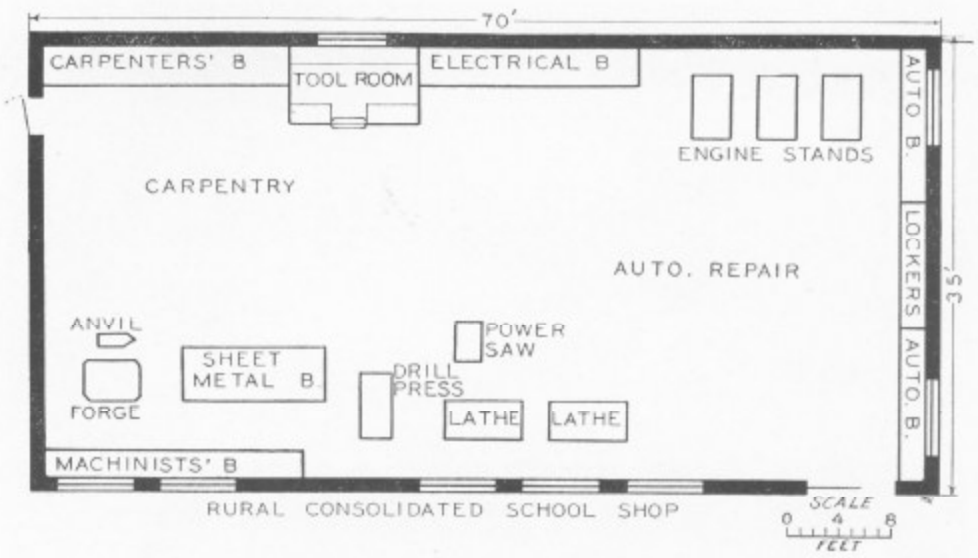
The equipment of this shop includes provision for a *planning* or drawing center for two pupils. Either cabinets or pedestal type tables may be used. Other items are: a two or more speed wood-turning lathe, two double four-vise table-type woodworking benches with lockers or drawers below, a small 6" to 8" motor-in-head circular saw, a 16" to 20" band saw, a good 6" to 8" jointer, a hand or motor-in-head grinder, a drill press (probably portable), a 13" x 5' back-geared screw-cutting metal-working lathe, a portable automotives bench, including a rebuilt Ford or other *engine that will run*, a molding bench, a sheet metal or soldering bench, an electrical area, and equipment for concrete work. Space is provided for experimental and assembly work, lumber storage, blackboards, a bulletin board, a tool board, lockers, and storage.

The arrangement is not only convenient and interesting but efficiently planned as well. What boy or even girl would not be eager to get into such a laboratory? It may be termed a *Laboratory of Industries*, for over ten industries are available for exploration and try-out. All of it can be housed in a room no larger than 23' x 35' and at a cost of less than two thousand dollars. Not all of the units need be developed at once, but think of the opportunity such a plan affords for doing a better and more varied type of shop work.

Blue Print Plans of Other Shops

In the past ten years the South Bend Lathe Works has made plan drawings of shops of hundreds of schools all over the world. These shops range in size from the small shop having a single lathe to the large shops having twenty or more lathes of various sizes and types. There are also many different kinds of shops, including Auto Mechanics Shops, Machine Shops, Varied Industry Shops, General Shops, etc. Various types of drives are also shown, including different arrangements for both overhead lineshaft and individual motor driven machines.

We will gladly furnish any superintendent, principal, supervisor or instructor with any of these blue prints. Write us telling the kind of a shop you are interested in and it is probable that we can send you blue prints of shops that have been installed by other schools having similar requirements. These blue prints are sent postpaid no charge, and there is no obligation whatever as we consider this a part of our service in the interest of vocational education.



Floor Plan of Rural Consolidated School Shop

Designed by MARIS M. PROFFITT, Specialist in Industrial Education, U. S. Dept. of Interior

The floor plan illustrated above is reproduced from a page in a bulletin "The General Shop" by Maris M. Proffitt, Specialist in Industrial Education, Office of Education, U. S. Department of the Interior, Washington, D. C. Anyone planning a General Shop, for a small school should send for this bulletin, as it contains valuable information and many helpful suggestions on the planning of a small General Shop and the teaching of the various subjects. This bulletin is for sale by the Superintendent of Documents, Washington, D. C., at 5 cents a copy.

The entire equipment for the above shop may be installed for less than $2,000.00. It consists of a forge and anvil, a sheet metal bench, a drill press, a power wood saw, two back-geared screw-cutting metal working lathes, a machinist's bench, a carpenter's bench, an electrical bench, an automotive bench, a small tool room and lockers. Much of the equipment, including the benches, lockers, tool room and engine stands may be made up in the shop as projects for the woodworking department, thereby reducing the cost of the installation to a minimum.

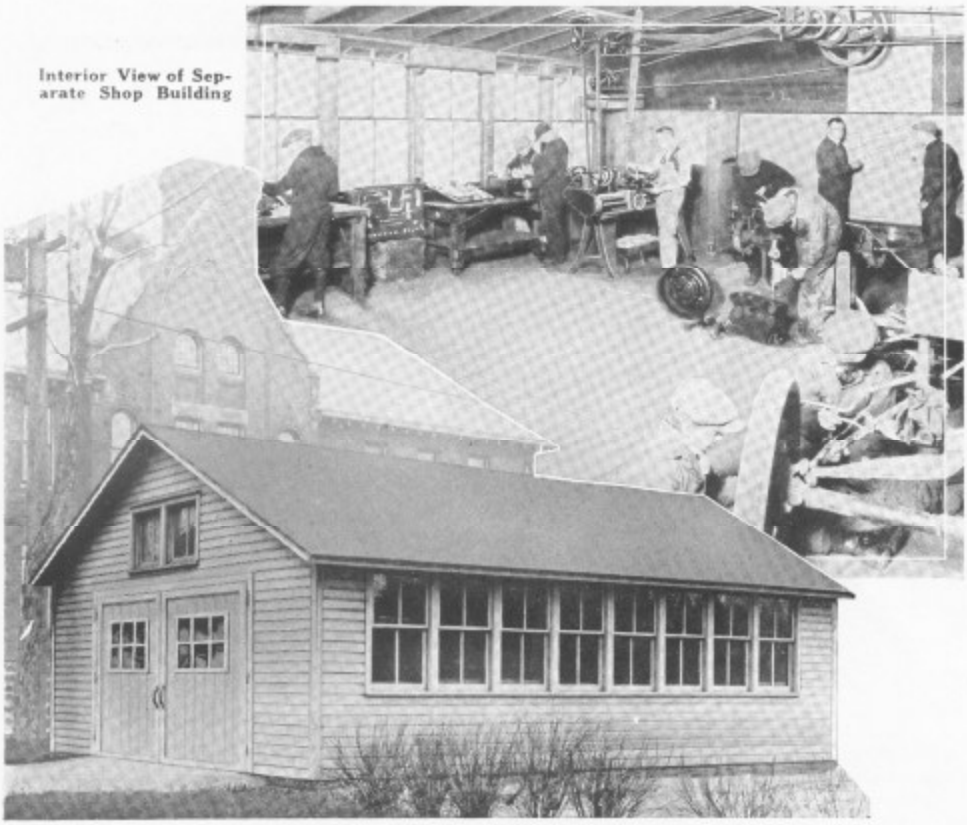
The size of the room is 35 by 70 feet, or a little less than 2,500 square feet of floor space. This shop will accommodate at least 20 boys per period, and there is plenty of room in the center of the floor for carpentry projects and auto repair classes. One instructor can take care of this entire shop.

It will be noticed that Mr. Proffitt shows two metal working lathes for this shop. This permits more comprehensive general shop work. It is considered better to install one small and one larger lathe, perhaps a 9 inch lathe and a 13 inch lathe. This permits taking care of a wide variety of work.

Equipment for a Comprehensive General Shop

Some of the larger schools have installed equipment for a comprehensive general shop. This equipment is similar to that shown in the above drawing, except that additional machines are installed to take care of a larger number of boys in each unit. There may also be a larger number of units in the comprehensive General Shop than in the small General Shop. The cost of the equipment for a comprehensive General Shop will range from $4,000.00 to $10,000.00. We have on file suggestive lists of equipment, floor plans, etc., and will be glad to assist anyone in planning a comprehensive General Shop.

Interior View of Separate Shop Building



Exterior View of Separate Shop Building.

Separate Building for General Shop

Many schools, in considering the installation of a General Shop, postpone action because there is no suitable room available in the school building. The illustrations show how one of many schools solved this problem.

On a corner of the school grounds a frame shop building about 25 feet by 40 feet was erected. The construction of this building is such that the cost was very low, but a fireproof building would have been preferable. The building is designed for ideal shop conditions, having large windows along both sides, affording excellent lighting for the entire shop. A large double door in one end permits the driving of automobiles into the shop for use in the instruction of auto mechanics. Steam pipes running underground from the main school building supply heat. The floor is of concrete.

Some schools are fortunate enough to have on the school grounds or nearby an old building that can be used for shop work. Sometimes temporary school buildings, erected for use while the main school building is being built or repaired, are remodeled for shop work. Another plan is to rent a nearby building for a temporary shop.

In some schools a separate shop building has been erected as a project for the advanced classes in woodworking and building trades. The construction of a shop building is an ideal project, as it may include experience in concrete work, plastering, electrical wiring, painting and plumbing, as well as woodwork.

Shop Building at Meriden, Kansas

The illustration below shows a typical example of a separate building for shop work.

School Shop Building at Meriden, Kansas

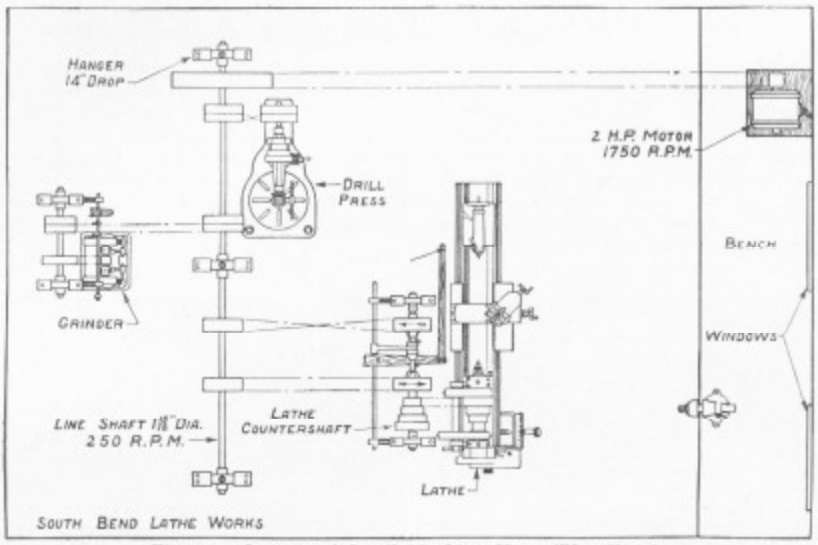


Fig. 12. Layout of Small Machine Shop (Plan View)

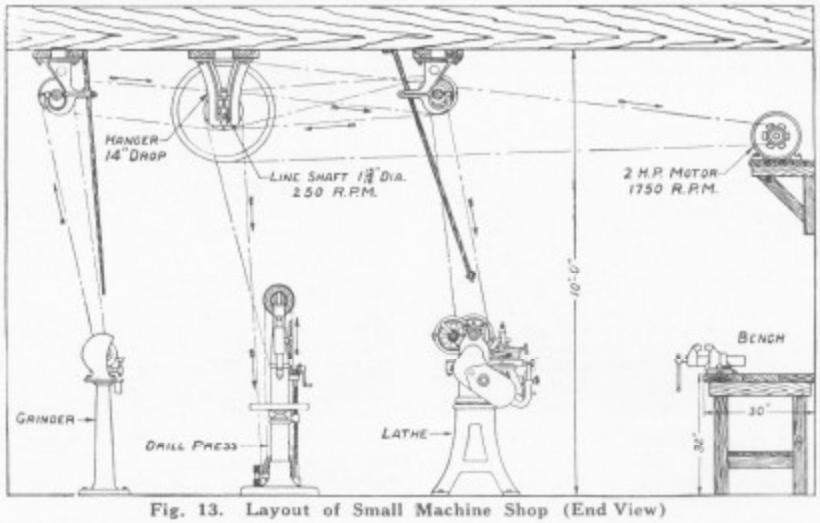


Fig. 13. Layout of Small Machine Shop (End View)

Equipment for Small Machine Shop

Lineshaft and Countershaft Drive

The above illustrations showing the arrangement of equipment for a small machine shop are taken from a page in our book "How to Run a Lathe." This equipment is for larger and heavier work than is usually done in the small General Shop. The machines are all of the countershaft drive type and are driven from an overhead lineshaft, the power being taken from a motor attached to the side wall.

The countershaft drive can be used in the General Shop, instead of individual motor drive, but when the cost of the motor, lineshaft, hangers, pulleys, belting and the extra labor of installing are considered, it is doubtful if there would be any saving. However, if the shop already has several countershaft driven machines which are to be used, it would be advisable to retain that type of drive.

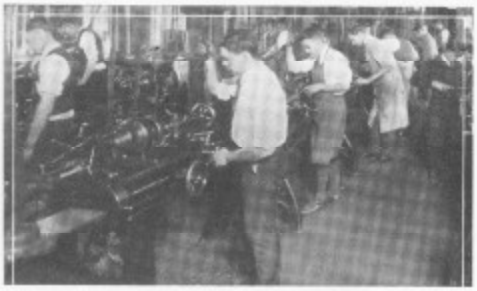
The individual motor drive equipment as shown on pages 4, 10, 11 and 14 is considered more modern and is much easier to install, as it affords a more flexible arrangement of the machines than the lineshaft drive. The modern tendency in small shops is to install the individual motor driven type of machine.

Views of Typical School Machine Shops

In the illustrations below we show one of each of the six major classes of machine shops ranging from the Junior High school shop to the college engineering shop. We have equipped over 2000 of these shops with machinery and tools during the past 20 years. Our Engineering Department assisted in making up the plans and specifications for many of these shops. The benefit of our experience is available to any school contemplating the installation of any type of school shop, including the small General Shop. We make no charge for work of this nature as we consider it a part of our service in the interest of vocational education.

THE JUNIOR HIGH SCHOOL SHOP

A number of boys operating Bench Lathes in a Junior High School Shop—their first experience in actual Machine Shop Practice.



THE TRADE SCHOOL SHOP

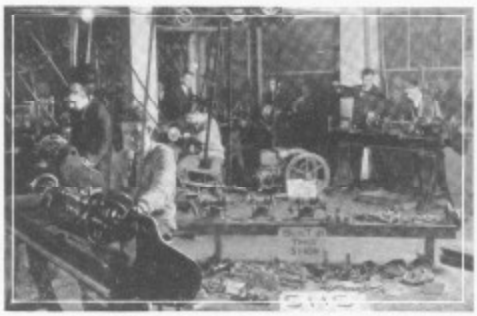
The illustration above is a common scene in the Trade School where the young man is being trained in correct Machine Shop Practice.

THE VOCATIONAL HIGH SCHOOL SHOP

The illustration above shows a Vocational High School Shop where part time students are learning the fundamentals of the Machinist Trade.

THE NIGHT SCHOOL SHOP

The Night School Shop is popular with the Industrial day worker and laborer. It enables him to improve himself in his spare time.



THE SENIOR HIGH SCHOOL SHOP

The illustration above shows a number of advanced students in a Senior High School Shop doing Machine Work.

THE COLLEGE ENGINEERING SHOP

The Machine Shop Department of an Engineering School is shown above. The Lathe plays an important part in the development of the young Engineer.

Notes On the General Shop

Organizing the Shop. The General Shop should be on the first floor, have plenty of light, and be in an accessible place in the building, preferably with an outside door. The subjects to be taught should be about as given in this bulletin as they represent the most popular industrial activities throughout the United States. A fundamental training in these subjects is of great importance to every boy.

Engineering Advice. If you are in doubt about the way to lay out your General Shop, method of placing the benches, machines, etc., write to us. Give us a rough sketch of the floor plan of the room you intend to use, showing location of windows, doors, ceiling height, and general dimensions. Our Engineering Department will submit suggestions and provide you with a blue print layout to meet the conditions and requirements in your own school.

Blue Print Plans of Other Shops. We have equipped hundreds of shops throughout the United States and have supplied blue prints of these shops. Many of the original drawings are on file in our office and blue prints will gladly be mailed to any superintendent, supervisor, or instructor who is interested.

Course of Study. The best method to follow in teaching the General Shop is the project method, using job sheets and blue prints for each project made or handled in the shop. If you are in doubt about getting started on a course of study, write us as we have abundant information available which we shall be glad to supply on request.

Job Sheets and Blue Prints. We have job sheets and blue prints made up covering 57 machine shop projects and are preparing job sheets and blue prints for the course in woodworking, forging, electrical, and auto mechanics units of the General Shop. Details regarding these job sheets and blue prints will be sent to anyone interested in the General Shop.

Reference Books. Suitable reference books on the General Shop are described in this bulletin. In addition, we supply an instruction book on Auto Mechanics. This book will be a valuable reference in the auto mechanics unit of the General Shop. A copy will be sent free of charge to anyone interested.

Making Wood Benches. Drawings and construction plans for benches of various types suitable for the General Shop are on file in our office. As most schools prefer to make their own benches because of the saving in expense, we shall be glad to supply blue prints of these benches without charge to anyone who is planning the installation of a General Shop.

Extending General Shop Activities. The General Shop will be found to be one of the most popular courses among the students in the entire school because it offers practical, interesting training. As the number of students increases, the capacity of the shop can be enlarged by adding new equipment each year. To those who have already started General Shop work and are interested in extending their activities, we have blue print plans and more comprehensive instruction material, details of which we shall be glad to supply on request.

Printing in the General Shop. The fundamentals of the printing trade are also taught in some General Shops. The printing trade is one of the largest in the United States; hence, offers a good field for properly trained students. A small printing press and an assortment of type make up the proper equipment for the printing unit of the General Shop. A text book on the printing trade used in school shops is "The Practice of Printing" by Ralph W. Polk, price postpaid **$1.80.**

Farm Mechanics. The constantly increasing use of machinery in agriculture makes training in the fundamentals of mechanics essential to the farm boy. In many consolidated schools located in rural districts a course in Farm Mechanics is offered to provide this training. This course may be added to the General Shop Course outlined in this bulletin and includes instruction in machine work, forging, electricity, mechanical drawing, farm buildings, concrete work, etc. We are preparing a bulletin outlining the Farm Mechanics course and will mail a copy on request to anyone interested.

Purchasing Equipment. In this bulletin we have listed all the machine equipment, small hand tools, accessories, and reference books to make up the General Shop complete in every detail. All of these materials may be ordered direct from us, using the prices given in the bulletin, or may be purchased separately. Small hand tools and accessories may be secured from your local hardware store if desired. We do not manufacture these small articles but list them as an accommodation to our customers. Any item you already have in your shop or wish to purchase yourself may be omitted from the list.

Quotations Supplied. Itemized quotations will be supplied on all material described in this book and more complete descriptive specifications will be supplied free upon request. The Educational Department of The South Bend Lathe Works is devoted entirely to rendering service to schools all over the world and will welcome inquiries from anyone who may be interested.

The South Bend Lathe Works

The South Bend Lathe Works was established at South Bend, Indiana, in 1906. For 25 years the entire plant has been devoted exclusively to the manufacture of South Bend Back-Geared Screw-Cutting Lathes. There are now 50,000 South Bend Lathes in use in the United States and 85 other countries.

About 90% of the South Bend Lathes manufactured are used in industry for the manufacturing of all kinds of metal products, for the making of the finest precision tools, master gauges, thread gauges, etc., and for maintenance and repair work in general. We feel that we have supplied about 80% of the lathes that have been purchased for use in school shops in the past 15 years by public schools, universities, colleges, engineering schools and trade schools throughout the United States.

The 9" Back-Geared Screw-Cutting Lathe illustrated in this bulletin was selected for the equipment of a small General Shop because it is so widely used in industrial and manufacturing plants for the working of all kinds of metals. On this lathe the student can quickly learn the fundamentals of the operation of a screw-cutting engine lathe which are the foundation of the machinists' trade.

South Bend Lathe Catalog No. 91-A

This new 104 page Catalog, No. 91-A, illustrates, describes and prices the entire line of 96 sizes and types of New Model South Bend Back-Geared Screw-Cutting Lathes, from 9" swing to 18" swing, countershaft or motor drive. Each size of lathe is fully described with its features and specifications. A full line of attachments, chucks, tools and accessories is also shown.

This catalog is 6"x9", it has 300 illustrations and is a reference book of considerable value to anyone interested in mechanical equipment. Mailed anywhere in the world upon request, postpaid, no charge.

Factory Where South Bend Lathes Are Made.

SOUTH BEND LATHE WORKS

428 EAST MADISON STREET, SOUTH BEND, INDIANA, U. S. A.

30M—3-5-'31

Printed in U.S.A.