

Farm Mechanics *in the* School



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Farm Mechanics Since 1700

The beginning of the farm shop in this country dates back to 1700, when there were workshops established by farmers in the Colonies from Massachusetts to Virginia. These shops were located in the barns, woodsheds and spare rooms and were usually manned and operated by fathers and sons.

In those days the principal tools were imported from England, but in due time some of these shops made such progress that in about 1800 a few of the farm shops in New England had developed into small factories and were turning out excellent work. Some of these factories began to build tools and machinery in a modest way, and naturally they looked to the other farm shops of the community for their trained mechanics.

It was in shops of this type that some of the early American inventors and mechanics got their start. Eli Whitney, of West-boro, Massachusetts, invented the cotton gin in 1793; Robert Fulton, Little Britain, Pennsylvania, invented the steamboat in 1807; Cyrus McCormick, Walnut Grove, Virginia, invented the harvesting machine in 1834; Elias Howe, Spencer, Massachusetts, invented the sewing machine in 1846.

Many of these men and thousands of other inventors and mechanics were products of the farm shops. Many had their own workshops where they developed their inventions and built their machines. It must be remembered that in the early days the shop equipment that these men had to use was crude and primitive compared with precision tools and machinery that are used in the modern shop.

Later George Westinghouse developed the air brakes for railroad trains; Henry Ford, who was born and raised on a farm, built the famous Model-T automobile; and the Wright Brothers made the first successful aeroplanes. All got their start with a small back-gearred, screw cutting lathe which they used in their workshops, where they developed the Westinghouse Air Brake, the Ford Motor Car, and the Aeroplane respectively. All of these men were inventors and mechanics. They loved tools and machinery because they understood and knew how to handle them.

This shows that the farm boy has just as much mechanical talent as the city boy, and if given an opportunity to develop this talent, may go far in the industrial world.

South Bend Lathe Works

Farm Mechanics in the School

This book has been prepared to illustrate and describe the equipment we recommend for use in farm mechanics shops established in conjunction with vocational agriculture courses in the public schools.

Modern farm machinery is highly efficient and practical, but when not properly cared for, it is short lived. To keep his mechanical equipment in good operating condition as long as possible so that it will be a profitable investment, is a real problem to the average farmer. In the State of Kansas alone the cost of repair and replacement of farm machinery is well over twenty million dollars a year, according to Kansas State Agricultural College Bulletin No. 22. Much of this expense could be saved if farmers were prepared to do their own repair work and to take the proverbial "stitch in time."

The best solution to the problem of farm machinery repair and maintenance is the establishment of a well equipped shop on the farm. This can be done only when the farm boy is trained to do his own repair work, and the logical place to obtain this training is in the school shop.

Progressive schools are now preparing farm boys for the future by offering excellent courses in vocational agriculture and farm mechanics. Leading educators feel that every American boy has the right to expect the training he receives in the public school to prepare him to earn a living, and if this is to be accomplished, practical subjects must be studied. By establishing a practical course in farm mechanics, boys can be given the opportunity to learn to do their own repair work and thus earn a better living on the farm.

Part time courses and evening classes in farm mechanics for older boys and adults have been established in some localities. These classes are conducted by the regular farm shop teacher and are usually held in the afternoon or evening, outside of the regular school hours.

The farmer who has some training in practical farm mechanics will derive a great deal of satisfaction and profit as a result of this mechanical experience. His farm repair shop will provide gainful employment during the winter and on rainy days when outside work is impossible. In it the mechanical equipment of his farm can be overhauled and repaired, broken parts replaced, and adjustments made. On the other hand, if the truck, tractor, family car, combine, plow, harrow, gasoline engine, spray equipment, water pump, light plant, and other mechanical equipment are overhauled and repaired in a commercial shop, the cost of having this work done may easily make the difference between operating the farm at a profit or a loss.

Acknowledgements

We are indebted to Professor Louis M. Roehl, Department of Agricultural Engineering, Cornell University, Ithaca, New York; Professor Ivan G. Morrison, Farm Shop Teacher Trainer, Purdue University, Lafayette, Indiana; and to other well known educators, for suggestions, shop plans and valuable criticism in the preparation of this bulletin.

Organizing a Farm Mechanics Shop

The principal objective of the Farm Mechanics Shop Course should be to enable the boy to establish a good repair shop on the home farm, and to give him sufficient experience and skill in the use of tools to take care of general farm repair work.

Varying conditions in different localities make it necessary to study local conditions and carefully plan a course in farm mechanics that will include the classes of work done by the average farmer living in the community. Much valuable assistance can be obtained from the United States Department of Agriculture, Division of Vocational Agriculture, Washington, D. C.; the United States Office of Education; and from similar offices of the various states and universities.

So many different kinds of mechanical work must be done on the farm that the question of what to include in a farm mechanics course and how to teach it merits serious consideration. Obviously, it is best to begin with the simple jobs with which every farm boy must of necessity become familiar if he is to be a real help to his father at home. However, the course should also include the more difficult jobs which the average farmer hesitates to attempt for lack of knowledge or skill.

Specialized instruction should be given to familiarize the boy with the more important classes of work, such as farm carpentry, forging, machine work, plumbing, mechanical drawing, electrical work, cold metal work, painting and concrete work. This can be accomplished by dividing the class into several groups, with each group working on a project that will include one or more of the important classes of farm shop work.

Practical experience in the repairing of farm equipment can be given by having each boy in the class bring in some broken or worn machine or implement to be repaired. The idea of inviting boys to bring repair work into the school shop may not appeal to some teachers. However, this is exactly the type of work the boy will be obliged to do when he is operating a farm of his own, and he should be prepared to take care of it.



Fig. 3. A Group of Farm Mechanics Students and Some Farm Machinery They Have Repaired.
Photo by University of Montana.

All classes of farm implement repair work can be taken care of in the farm mechanics shop that is properly equipped. A farm mechanics teacher who is unfamiliar with certain crafts or trades can obtain reference books, trade publications, instruction manuals, etc., on any class of work that may be involved. See pages 26 to 30.



Fig. 4. Farm Mechanics Shop with Boys Working on Several Classes of Farm Shop Projects.

Suggested Classifications of Projects

Conditioning Tools. This classification includes the sharpening of saws, knives, chisels, hatchets, axes, drill bits, augers, hoes, plane bits, scissors, etc., cleaning and re-conditioning shop tools, fitting new handles, and similar work.

Implement Repair Projects. This includes the repair and maintenance of all types of farm machines, such as feed grinders, mowing machines, binders, plows and cultivators. The work involved will include forging, machine work, woodwork and painting. This is an important class of farm shop projects, as it includes the repairing of the most important class of equipment in general use on the farm.

Power and Transportation Projects. This division of farm shop work includes machine work, forging, acetylene or arc welding, cold metal work, and painting in connection with the repair and maintenance of automobiles, trucks, tractors and gasoline engines. A study of electricity in connection with the use and operation of electric motors and automobile and tractor ignition, starting and lighting should be included.

Building Projects. This classification includes the repair and construction of farm buildings and foundations, farm carpentry, concrete work, plumbing, sheet metal work, painting, electric wiring and farm planning. Some drawing and blueprint reading should be included.

Miscellaneous Projects. This group includes the minor repair jobs, such as harness and rope work, soldering, elementary carpentry and metal work.

Clay Township School

St. Joseph County, Indiana

Fig. 5. Right. Exterior of Washington School, Clay Township, St. Joseph County, Indiana.

Fig. 6. Below. Boys working on farm shop projects in Clay Township School. Mr. Clarence Lindzy, instructor. This shop is equipped with a 9-inch swing South Bend Metal Working Lathe.



New Carlisle High School

New Carlisle, Indiana

Fig. 7. Left. Exterior of auditorium and shop building of New Carlisle High School, New Carlisle, Indiana.

Fig. 8. Below. Farm mechanics shop in New Carlisle High School. Mr. C. R. Bonham, instructor. This shop is equipped with a 9-inch swing South Bend Metal Working Bench Lathe, power drill press, electric grinder, forge and other machinery.



Lakeville High School

Lakeville, Indiana

Fig. 9. Left. Exterior of Lakeville High School at Lakeville, Indiana.



Fig. 10. Below. Farm mechanics shop in Lakeville High School. Mr. J. D. Kintzel is instructor. This shop is equipped with a 9-inch swing South Bend Metal Working Lathe. Note excellent tool board in background.



Brazil High School

Brazil, Indiana

Fig. 11. Right. Entrance to farm mechanics shop in Brazil High School, Brazil, Indiana. Note wide door.



Fig. 12. Below. A corner of the farm mechanics shop at Brazil, Indiana. Photograph supplied by Adam Bowles, instructor. This shop is equipped with two South Bend Bench Lathes, a jig saw and other power machinery.



Fig. 13. Right.
Interior of Farm
Mechanics Shop at
Cornell University.

Photo by Professor
L. M. Roehl.



Fig. 14. Above, Exterior of Farm Mechanics Shop at Cornell University. Photo by Professor L. M. Roehl.

How to Plan a Farm Mechanics Shop

Careful planning will assure a satisfactory farm mechanics shop with ample space for the convenient arrangement of equipment and the necessary facilities for practical shop work. A preliminary survey should be made to determine the number of boys likely to be accommodated and the type of mechanical equipment used on the surrounding farms.

After deciding on the approximate number of boys and the type of work to be done, a list of the necessary machinery, work benches, tool cabinets, forges, etc., should be made. Cardboard dummies of each machine and bench made to the scale of $\frac{1}{4}'' = 1'$ will be a big help in planning the arrangement of the equipment and determining the approximate floor space required for the shop. A clear working space in the center of the shop large enough for one or more farm machines should be included.

When the approximate size of the shop has been determined the floor space required may be compared with the available room or building. If no suitable room is available a separate building may be used to advantage. The work done in the shop is often noisy and fumes from the forge may be objectionable. Large doors, plenty of light and flues for forges are seldom available in buildings planned for other school purposes.

Some schools have on the school grounds, or nearby, an old building that can be converted into a shop. Old churches, schools and halls have been used.

(Continued on page 7)

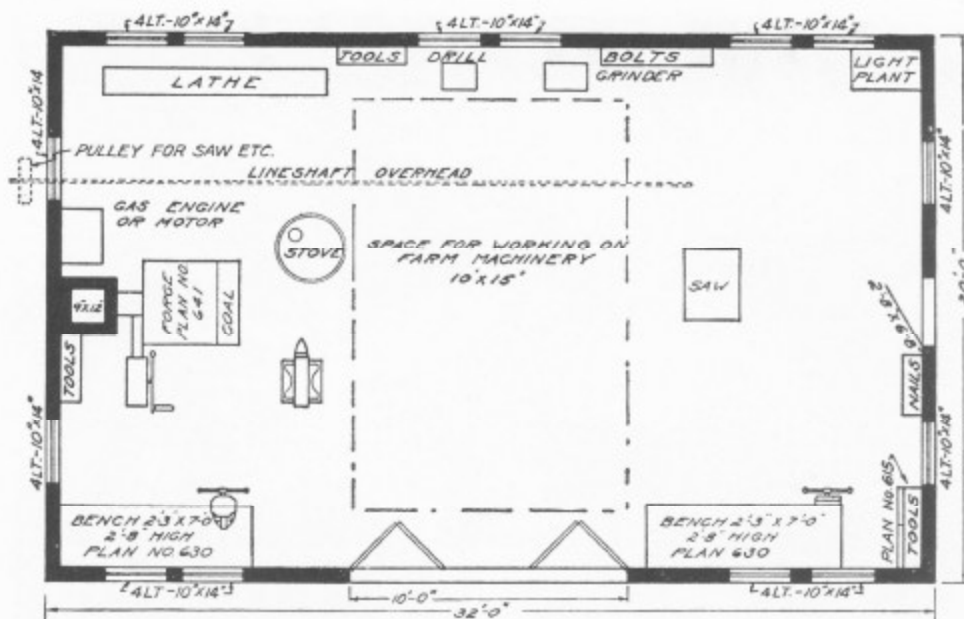


Fig. 15. Floor Plan of Farm Mechanics Shop Building.
From Kansas State Agricultural Bulletin No. 9.

(Continued from page 6)

A floor plan of the shop should be drawn to the scale of $\frac{1}{4}" = 1'$ and the cardboard dummy of each machine, bench, etc., placed on this plan in various positions until the most satisfactory arrangement is obtained. The outline of each piece of equipment should then be added to the plan. Fig. 15 shows an excellent floor plan of a small farm shop taken from Kansas State Agricultural College Bulletin No. 9.

The floor should be of concrete and should have a drain so that it can be scrubbed. A large overhead type door 12 ft. wide and 10 ft. high should be provided so that farm machinery can be taken into the shop without difficulty. Windows should be large and spaced closely to take full advantage of daylight. The lower edge of the windows should be at least 6 inches higher than the bench tops to avoid danger of breaking glass. If possible, the building should be heated from the main school building heating plant by running steam pipes underground to the shop building. If this cannot be arranged, an individual heating plant may be installed.

The building should be equipped with electric lights and modern plumbing facilities. There should also be flues for forges, and these should be separate from flues for the heating plant. For best results, place the forge flues inside, rather than outside the shop wall. Fire-proof construction of hollow tile, brick or concrete block is preferable.

A separate classroom should be provided, either in the main school building, or as an annex to the shop building.



Fig. 16. School Shop Building at Meriden, Kans.



Fig. 18. A Corner of the Farm Mechanics Shop at Cornell University Showing Students Doing Machine Work and Rope Work. Photo by Professor L. M. Roehl.

Fig. 19. Right. Boys in Farm Mechanics Class Working at the Forge in Washington Clay Township School, St. Joseph County, Indiana.



Fig. 20. Left. Gumming a Circular Saw with a Power Grinder. Photo by Professor Ivan G. Morrison, Purdue University, Lafayette, Indiana.

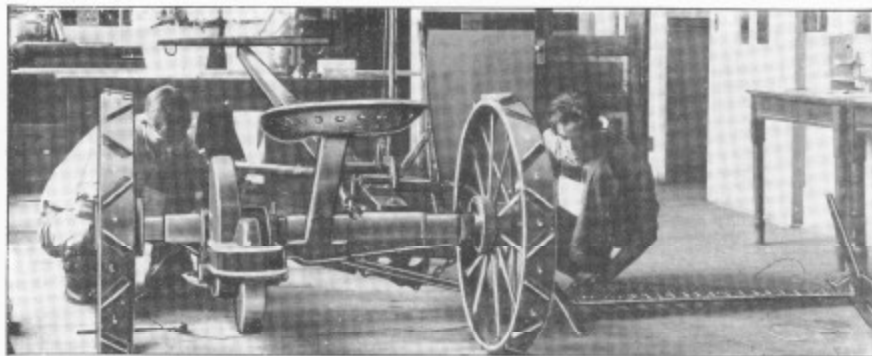


Fig. 21. Boys in Farm Mechanics Class Overhauling a Mowing Machine.
Photo by College of Agriculture, Atlanta, Ga.



Fig. 22. Drilling a Steel Plate in a Lathe Equipped
with a Drill Pad and a Drill Chuck.



Fig. 23. Sharpening a Scythe. Photo by
Prof. L. M. Roehl, Cornell University.

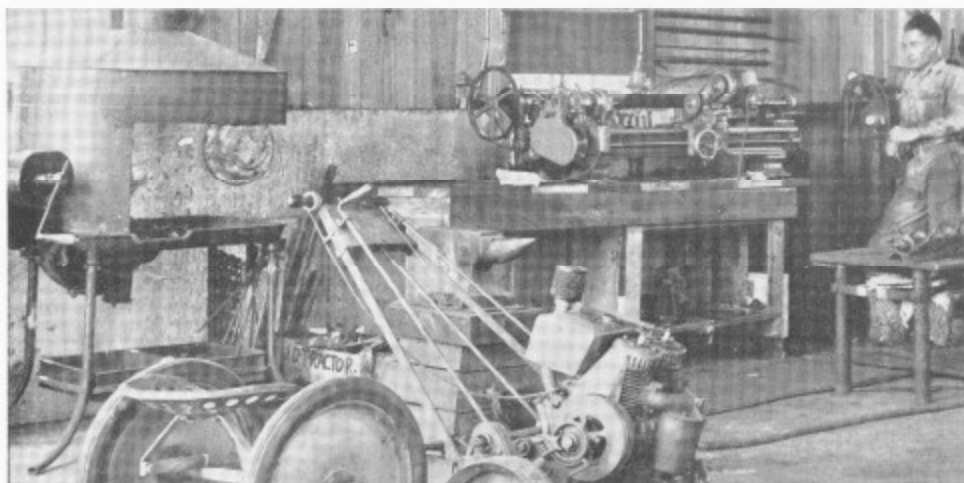


Fig. 24. Elmendorf Farm Repair Shop, Elmendorf Farms, Near Lexington, Ky.

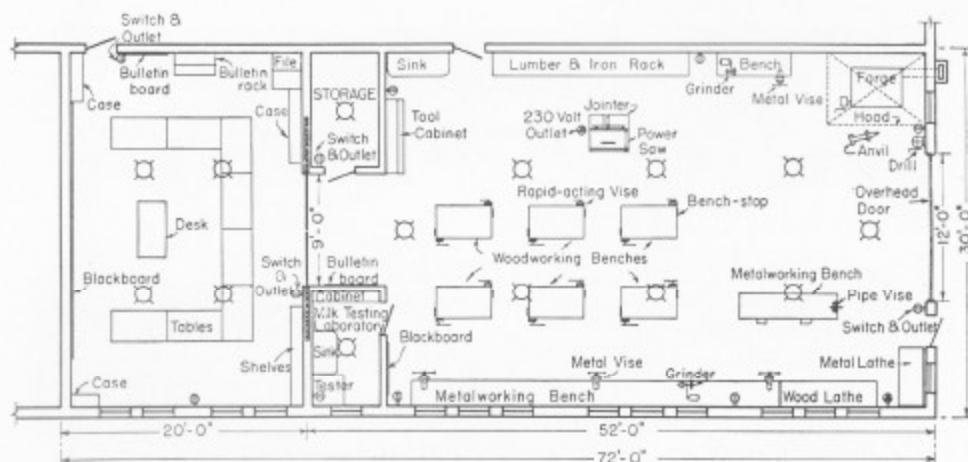


Fig. 25. Shop and Class Room for Department of Agriculture by Louis M. Roehl, Professor of Farm Mechanics, Department of Agricultural Engineering, Cornell University.

Shop and Class Room

for Department of Vocational Agriculture

By Louis M. Roehl, Professor of Farm Mechanics,
Department of Agricultural Engineering, Cornell University.

The classroom and shop shown above are designed for a class of twenty boys. A nine-foot rolling door between the classroom and shop makes it possible for both rooms to be used at the same time. The entire floor space may be used for school and community fairs, or the teacher may supervise work in both rooms at the same time.

Ample artificial light is provided. Four ceiling lights are in the classroom and eight in the shop. There is also a ceiling light in the milk testing laboratory and storage room. Switches and outlets are placed at the doors. Service outlets are placed on the walls of both classroom and shop at convenient places for connecting extension cords and for the motors that run the grinders, drill press and lathes.

The classroom arrangement is popular with teachers of vocational agriculture. A blackboard on the front wall of the room extends nearly all the way across. Space for a storage case is left at each end of the board. Shelves are built for storage purposes on the back wall of the room.

A twelve-foot outside door is placed in the end of the shop. Thus provision is made for work in repairing farm machinery and for the construction of farm appliances, such as hay racks, farm trailers and portable chicken houses. The overhead door has been found to be most satisfactory.

No shop course is complete without work in the overhauling of farm machinery and tractors. The machine work requires a forge, metal working lathe, drill press, and other machinery shown. A canopy is built over the forge, as indicated by the dotted lines. A chimney is built outside the full height of the building. This is better, in most cases, than to place the forge where the smoke must be taken to the main chimney of the heating plant of the building.

A shop of these dimensions, thus arranged and equipped with the tools and machines, makes it possible for a teacher to conduct a class of twenty and do the work that arises on the farms and in the homes of any rural community.

Outline of Shop Course

For Boys Taking Vocational Agriculture

By Louis M. Roehl, Professor of Farm Mechanics,
Department of Agricultural Engineering, Cornell University.

It is recommended that several kinds of work be carried on at the same time in the farm mechanics shop. Less money is thus required for equipment, and the shop space, which is usually limited, can be better utilized. By rotating the various members of the class on the different classes of projects listed below, the work can be done efficiently without interferences, such as waiting on tools.

Tool Fitting Jobs

1. True up an emery grinder that is out of round
2. Joint, gum, set and file a crosscut saw
3. Joint, gum, set and file a circular saw
4. Lay out and file teeth of hand rip and crosscut saw
5. Fit a hand rip saw
6. Fit a hand crosscut saw
7. Fit a pruning saw
8. Fit a handle in an axe
9. File an auger bit
10. Fit a handle in a shovel or fork
11. Make a wood handle in the lathe for a chisel or other tool

Grind the Following Tools

- | | |
|-------------------|-------------------------------------|
| 1. Axe or hatchet | 8. Scythe or sickle |
| 2. Drill | 9. Scissors |
| 3. Plane iron | 10. Pruning shears |
| 4. Butcher knife | 11. Make a drill and chisel templet |
| 5. Wood chisel | 12. Sharpen other edged tools |
| 6. Cold chisel | |
| 7. Drawshave | |

Cold Metal Working Jobs

1. Learn how to drill a hole of a given size, in a given place, in iron in each of five ways: a drill and carpentry brace, a breast drill, a chain drill, a drill press, a lathe
2. Learn how to use a set of taps and dies in a workmanlike manner
3. Use the hack saw to cut iron off straight
4. Learn how to use a mill file properly
5. Repair a broken piece of iron by riveting a piece on the side of it
6. Make an adjustable tool rest (optional)
7. Do a practical farm repair job involving above work

The Farm Workshop

1. Draw a plan of a work shop to suit the needs of a particular farm
2. Make a list of the necessary tools and find cost
3. Study types and uses of various nails, bolts, screws, hinges, rivets and builders hardware

Concrete Jobs (Class Project)

1. Build a section of walk or platform (testing gravel, mixtures, troweling and finishing)
2. Build wall or steps (reinforcing)
3. Do a repair job as applied to farm buildings

Woodworking and Carpentry

I (Any two)

- | | |
|---------------------|--|
| 1. Cutting board | 4. Do a simple repair job on the home farm buildings |
| 2. Bench hook | |
| 3. Clothesline reel | |

II (Any two)

- | | |
|---------------------------|---------------|
| 1. Nail box | 4. Foot stool |
| 2. Poultry or feed hopper | 5. Bird house |
| 3. Water stand | |

III (Any two)

1. Saw horse
2. Octagonal waste basket
3. Bushel crate
4. "Slip stick" measuring tool
5. Tool rack for home tools

IV (Any two)

- | | |
|-----------------------------|-----------------------------|
| 1. Handy house-hold ladder | 7. Poultry feeder |
| 2. Saw filing clamp | 8. Range shelter |
| 3. Fitting handles | 9. Brooder house |
| 4. Window screen | 10. Hay rack |
| 5. Tool carrying box | 11. Roadside stand |
| 6. Eveners and whiffletrees | 12. Work bench |
| | 13. Lay out a common rafter |

Forge Work

1. Build and keep a good fire
2. Square up a piece of round iron and round a piece of square stock
3. Make a small hook
4. Make a dandelion or weed digger
5. Make a butchering or hay hook
6. Make a clevis pin
7. Make a repair link
8. Shape and temper a pickaxe
9. Shape and temper a cold chisel
10. Make and temper a center punch
11. Shape and temper a punch
12. Punch a hole in a flat iron
13. Do a practical farm repair job involving above work

Drawing Jobs

1. Make sufficient freehand sketches of construction details to become familiar with procedure
2. Make working drawing to scale and make out bill of material for construction
3. Make a scale drawing of small building and figure bill of material
4. Learn to read a blue print

Outline of Shop Course—Continued

Harness Repairing

1. Make a stitching thread
2. Make a stitched splice
3. Sew on a buckle
4. Replace a hame staple
5. Repair bottom end of hame
6. Repair a breeching
7. Replace a hame clip on a tug
8. Splice a tug
9. Clean and oil a harness
10. Cut a strap from a half hide

Painting, Glazing and Refinishing Jobs

1. Paint some article made in the woodworking course using a priming coat and one finishing coat of common paint
2. Finish the oak piece made in the woodworking course, filling, shellacking, and varnishing
3. Clean a paint brush of varnish, shellac or paint, and learn how to store it for further use
4. Re-finish a piece of old furniture to involve glueing, varnish removing, staining, shellacking and varnishing
5. Replace glass in window

Power Machinery Jobs

1. Single cylinder gas engines:
 - a. Principles
 - b. Cleaning carbon and grinding valves
 - c. Ignition and timing
 - d. Machine work
2. Tractor and other multiple cylinder engines:
 - a. Ignition systems and troubles
 - b. Fuel system and troubles
 - c. Cooling systems and troubles
 - d. General oiling and greasing
 - e. Reface valves
 - f. Machine work

Electricity on the Farm

1. Know wiring materials and their use. Connect a bell circuit making use of splices and mechanical devices
2. Repair an electrical appliance from home
3. Make a shut-off switch from an alarm clock
4. Know types and care of electric motors
5. Make standard electrical splices and tie underwriters knot
6. Repair extension cord
7. Replace heating element
8. Farm fencing (electric)

Plumbing and Water Supply

1. Cutting and fitting pipes and connections
2. Packing of faucets and valves
3. Study principles of simple lift and force pumps and their application in water systems
4. Repair leaking faucet
5. Repair toilet tank bulb

Field Machinery Jobs

1. Each member of class to inventory the farm machinery and list the repairs needed and total investment
2. Machines used on the farms of the community to be brought into the shop and generally overhauled:
 - a. Clean machines
 - b. Replace broken castings
 - c. Repair or replace broken wood parts
 - d. Forge repair parts when practical
 - e. Replace lost or broken bolts
 - f. Adjust bearings
 - g. Babbitt bearings
 - h. Paint wood and iron
 - k. Repair and fit mowing machine cutter bar and replace guards

Class Projects

3. Study care, operation and housing of machinery
4. Make plans of implement sheds and other storage places

Terracing, Draining and Fencing

1. Leveling and running a line of levels
2. Figure data for cuts, ditches and problems for practice
3. Repair a farm fence or gate
4. Set a line of fence posts and stretch wire fence

Power Transmission (Class Project)

1. Belt lacing, kind of belts and methods of lacing each
2. Care and use of various types of belts
3. Pulleys: kinds, sizes and speed relations
4. Turn shaft and pulleys
5. Make a bushing and collar

Rope Jobs

- | | |
|-----------------------------|------------------------------|
| 1. Whipping | 9. Miller's knot or bag knot |
| 2. Crown and end splice | 10. Sheep shank |
| 3. Square knot | 11. Half hitch |
| 4. Figure eight knot | 12. Two half hitch |
| 5. Binder knot | 13. Timber hitch |
| 6. Bowline knot | 14. Half hitch and timber |
| 7. Sheet bend | 15. Clevis hitch |
| 8. Manger knot | |
| 16. Scaffold hitch | |
| 17. Hay rope or long splice | |
| 18. Eye or side splice | |
| 19. Replace a broken strand | |

Sheet Metal Jobs

1. Operate a blow torch
2. Tin a soldering copper
3. Solder a hole in sheet metal
4. Solder a seam in a pail or can
5. Sweat on a patch on sheet metal
6. Lay out a pattern for a tool box
7. Lay out pattern for a scoop
8. Cut out and make a scoop or tool box
9. Solder some home equipment

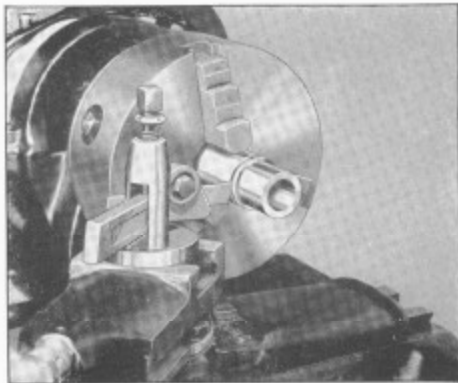


Fig. 26. Making a Rushing in a Metal Working Lathe.

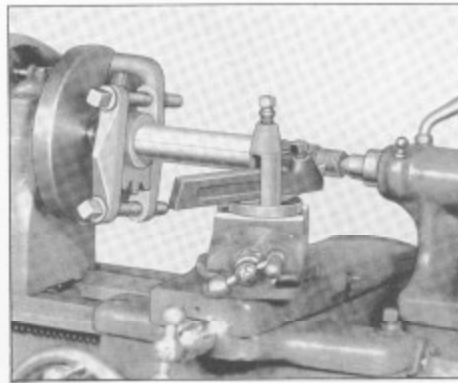


Fig. 27. Cutting a Screw Thread on the End of a Shaft.

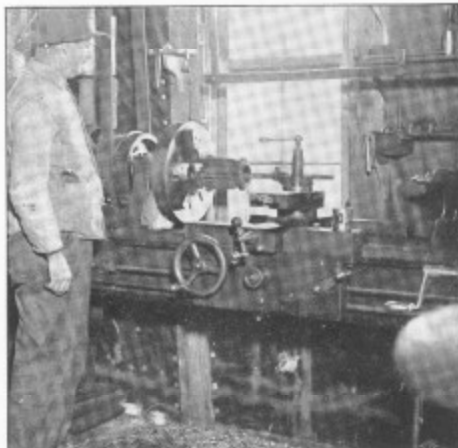


Fig. 28. Reboring an Engine Cylinder in the Farm Shop of A. E. Marts, Near Darlington, Ind.



Fig. 29. Repair Shop on the A. M. Todd Farm, Near Fenville, Mich.

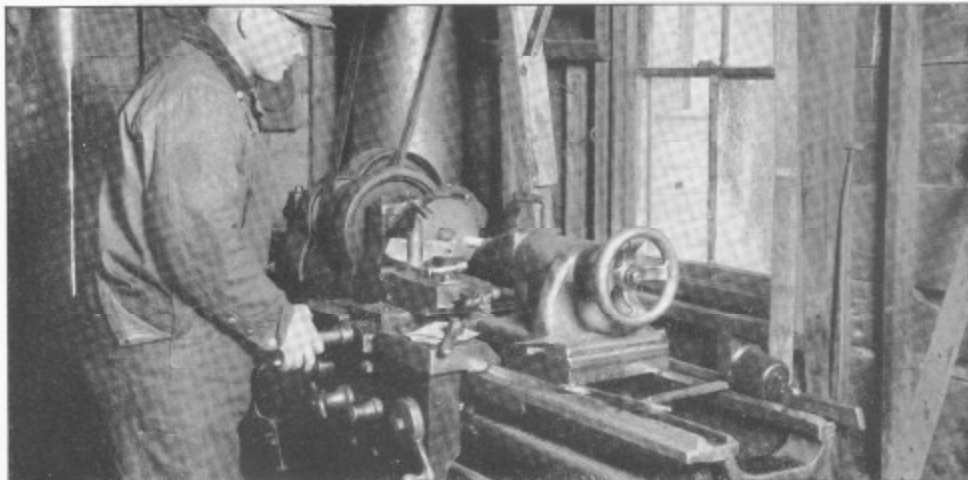


Fig. 30. Metal Working Lathe in the Repair Shop of the Brae Burn Farms, Near Hatchville, Mass.

NOTE—The illustrations above show the interiors of typical farm shops and are not intended to demonstrate the best lathe practice. For example, the operator of a lathe should have his sleeves rolled up for safety.



Fig. 31. A Model "T" Ford Converted into a Power Cut-off Saw
by Jimmy Richmond, Phelps, N. Y.



Fig. 32. Finishing a Tractor Piston in a
Metal Working Bench Lathe.

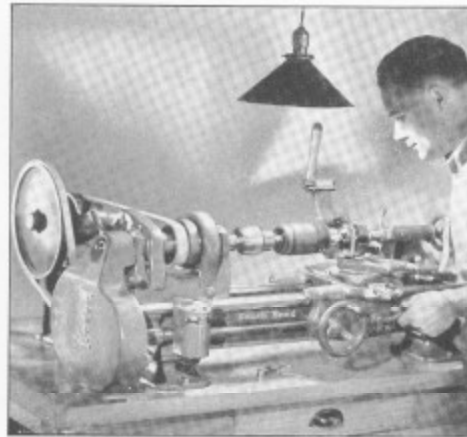


Fig. 33. Truing an Armature Commutator by
Remachining in a Metal Working Lathe.

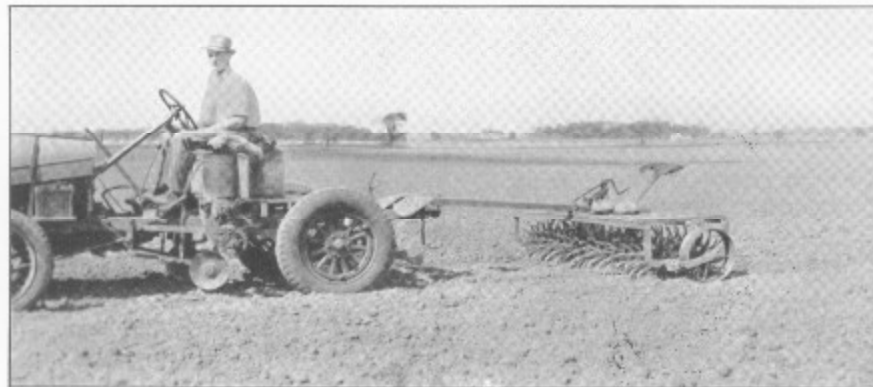


Fig. 34. A Good Farm Tractor Made of an Old Automobile
by Ray Fribbley, Bourbon, Indiana.

Suggestions on Selecting Shop Equipment

Selecting Correct Equipment for the school shop is important because of the relatively high cost of machinery and the great variety of sizes, types and drives available. A proper selection of shop equipment will save considerable money and will improve the facilities of the shop.

Good Quality is of utmost importance as only the best shop machinery has the perfection of design and workmanship so necessary for satisfactory service, durability and economy. This does not mean that the most expensive machine should be purchased. Usually, a moderately priced machine made by a reliable manufacturer is the most desirable.

Two Methods of driving the shop machinery are in general use, Lineshaft Drive and Individual Motor Drive. Lineshaft Drive is practical and is recommended for shops that do not have access to electric power. The lineshaft may be driven by a gasoline engine, which may be placed outside the shop room if desired. A countershaft, driven by belts from the lineshaft, is usually installed for each power operated machine in the shop.

Individual Motor Drive for each machine in the shop has been growing in popularity, because it is convenient to operate, easily installed, and visibility in the shop is improved. A 9-inch swing lathe may be operated by a $\frac{1}{4}$ H.P. electric motor, which can be connected to any convenient electric lamp socket. No special wiring is necessary unless machines having $\frac{1}{2}$ H.P. or larger motors are used.

The Size of a Lathe is determined by the swing over the bed and the length of the bed, as shown by "A" and "C" in Fig. 35. For example, a 9" x 3' lathe is one having a swing over the bed "A" of 9 inches and a bed length "C" of 3 feet. The distance between centers "B" is considerably less than the length of the bed, so this figure should be considered carefully when selecting the lathe for your shop.

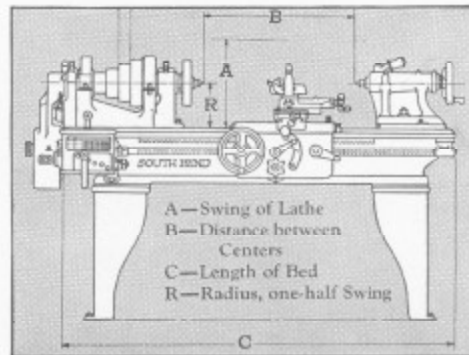


Fig. 35. How to Determine the Size of a Lathe.

The Tendency of the Modern School in the purchase of equipment is toward smaller machine units; for example, the 9-inch swing back-geared screw cutting lathes are often used in place of larger sizes of lathes. However, in some localities the farm mechanics shop will find use for the larger sizes of machines, including lathes having a capacity up to 24-inch swing.

Planning a New Shop. If you are planning a new Farm Mechanics Shop, the services of our Engineering Department are available. We shall be glad to help you plan the arrangement of the equipment in your shop, make floor plans, estimate cost of equipment, etc. There is no cost or obligation for this service to any instructor, supervisor or other school official. Write to South Bend Lathe Works, 553 Niles Ave., South Bend, Ind., Attention of Engineering Department.



Fig. 36. Metal Turning on a Small Back-Geared Screw Cutting Lathe.

Variety of Work Done on a Small Bench Lathe

A surprising variety of work can be done on a small back-geared screw cutting metal working lathe. All of the parts shown in Fig. 37 below were machined on a 9-inch swing bench lathe with 3-foot bed. Most of the parts are made of steel, brass, cast iron, spring wire, tool steel, and other metals, but a few of them are made of fibre or other non-metallic materials.

In addition to the usual machine operations, such as turning, boring, facing and cutting screw threads, the lathe can be fitted with attachments for milling and keyway cutting, drilling, polishing, spring winding and other special operations. The almost unlimited variety of work that can be done on the lathe makes it the most essential tool in any repair shop.

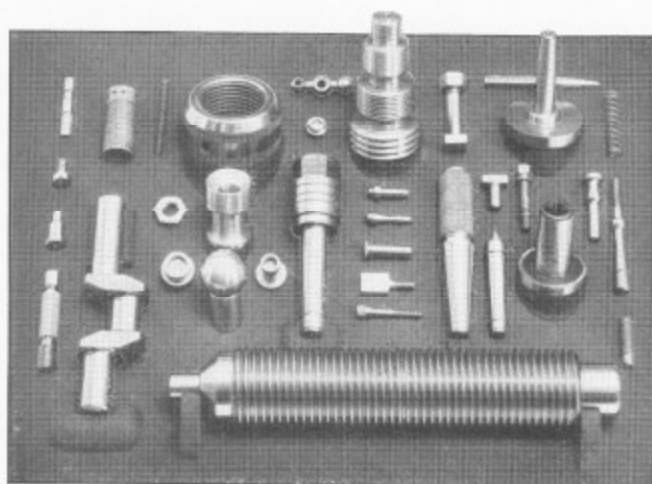


Fig. 37. Metal Parts Machined Entirely on a 9-inch Swing Back-Geared Screw Cutting Metal Working Lathe.

Wood Turning on a Metal Working Lathe

When equipped with a double pulley on countershaft to provide a series of high spindle speeds, in addition to the regular spindle speeds, a metal working lathe may be used for wood turning operations of all kinds. The general design of the metal working lathe is very much the same as the wood turning lathe, except that the metal working lathe is more heavily constructed, has greater strength and rigidity and is equipped with back gears which provide the slow spindle speeds required for machining hard metals.

The power carriage feeds and the compound rest feeds of the metal working lathe are especially helpful when making wood rollers, spindles, bushings and other wood parts requiring straight, accurate cuts. The ordinary wood turning lathe is equipped with a hand rest only, which makes it necessary for the operator to acquire considerable skill before parts can be turned with any degree of accuracy.

The metal working lathe may be equipped with a hand rest so that hand turning chisels may be used exactly the same as with the wood turning lathe if desired. However, except when turning irregular shaped parts, it is much easier for the operator having a limited experience to use the power carriage feeds and regular turning tool of the metal working lathe for wood turning.

Fig. 38. Right.

Turning a wood part on a metal working lathe which is equipped with a hand rest for wood turning and a special drive to provide high spindle speeds.



Fig. 39. Left.

Examples of wood and fibre parts turned on a small metal working lathe. Some of these parts were made with hand rest and hand turning tools, and other parts were made with the power carriage feed and regular turning tool.

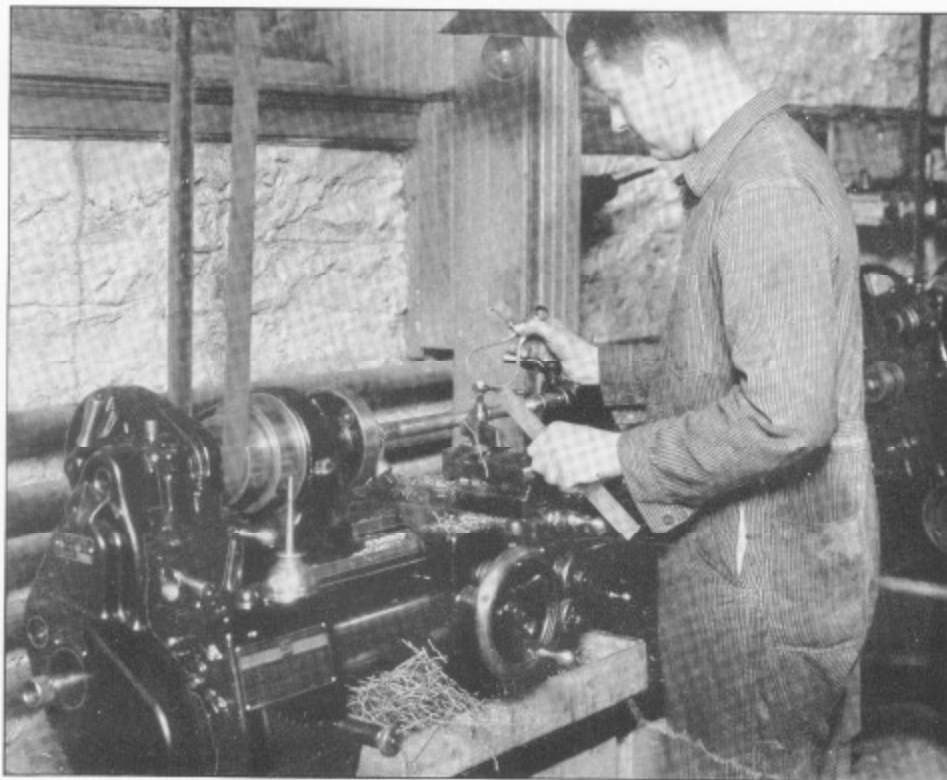


Fig. 40. A Farm Mechanics Student Making a Repair Part for a Farm Implement on a 9-inch Swing South Bend Lathe. Photo by College of Agriculture, Columbia, Missouri.

The Metal Working Lathe in the Farm Mechanics Shop

The lathe is used in the Farm Mechanics Shop for refacing valves, truing commutators, boring rebabbitted connecting rods, finishing pistons, making bushings and bearings, cutting screw threads, testing and straightening bent shafts, and hundreds of other jobs in connection with the repair and maintenance of tractors, automobiles, gasoline engines and other farm machinery and equipment. It is also useful for making replacement parts, general machine work, turning, boring, facing, reaming, filing, polishing, etc.

In many communities where there are no well equipped commercial shops, farmers living near the school depend on the lathe and other equipment of the farm mechanics shop for emergency repairs during rush seasons when break downs are most frequent and loss of time is most costly.

The back-gear screw cutting lathe is known among mechanics as the universal tool, because it can be used for so many different kinds of work. When fitted with the necessary attachments, this type of lathe can be used for cutting keyways in shafts and other milling operations, grinding and sharpening cutters and reamers, wood turning, etc. The lathe can also be used as a drill press for drilling and boring wood and metal parts.

Anyone who has some mechanical ability can easily learn to operate the metal working lathe, as it is no more difficult to use a lathe than to drive an automobile, operate a cultivator, run a tractor, or use any other type of mechanical equipment.

(Continued on page 19)

(Continued from page 18)

The 128-page book "How to Run a Lathe" and other instruction books supplied with the lathe explain in detail how to use the lathe for various classes of work.

The size and type of lathe that should be selected depends on the class of work that will be done in the shop and the size of the shop. A small lathe is usually selected for use in small shops where a limited amount of work will be done. The 9-inch swing South Bend "Workshop" Horizontal Motor Driven Bench Lathe is one of the most popular lathes for this type of shop. This lathe with a practical assortment of chucks and tools for general all around machine work will cost from \$150.00 to \$200.00, depending on the length of bed and the equipment selected. A 4½-ft. bed length is recommended, as this will permit machining shafts up to 35 inches in length between centers.

In larger shops where there is sufficient machine work to justify the additional cost, it is better to install a 13-inch swing or 16-inch swing lathe with a 6-ft. or 8-ft. bed. The larger lathe is preferable as it has greater capacity and more power. Either a motor driven lathe or a countershaft driven lathe may be selected. If no electric power is available, a gasoline engine can be used to drive the lineshaft for operating the lathe and other machinery in the shop.

A 13-inch lathe with 6-ft. bed and a practical assortment of chucks and tools for general machine work can be purchased for approximately \$750.00. The 16-inch lathe with similar equipment will cost about \$1000.00. If interested, write for a free catalog.

Fig. 41. End View of Pedestal Motor Drive.

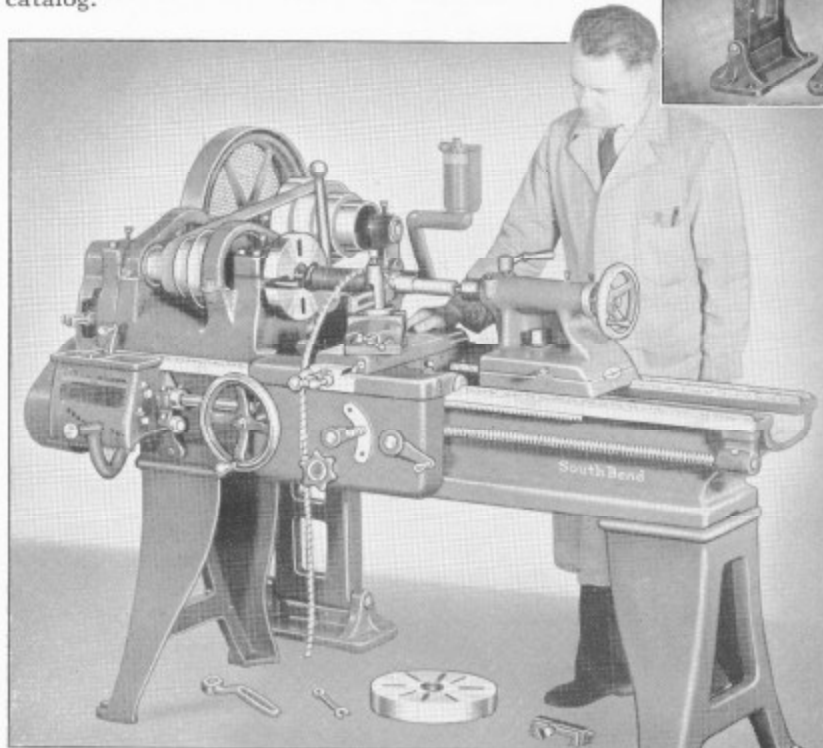
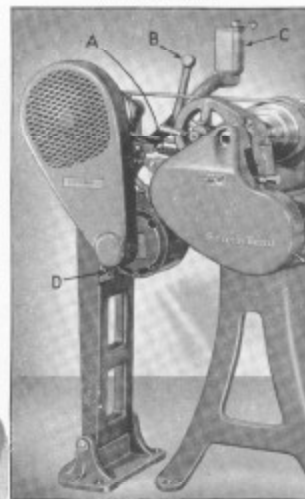


Fig. 42. 16-inch Quick Change Gear Pedestal Motor Driven South Bend Metal Working Lathe.

Farm Mechanics Shop Equipment No. 1

The floor plan on page 21 shows the arrangement of equipment in a practical farm mechanics shop for a class of 10 to 15 boys each period. This shop is 24 ft. x 36 ft., with an overhead door 12 ft. wide and a working space in the center large enough for farm implements to be brought into the shop.

Windows are provided along both sides of the building, and a flue is installed in one corner for the forge. Work benches, lockers and tool cabinets are placed along the wall.

The major items of equipment are listed below, and the approximate cost of the small hand tools and accessories for the various classes of work are listed.

Equipment for Farm Mechanics Shop No. 1

Estimated Cost of Major Items

| | |
|--|----------|
| 1—9"x4½" "Workshop" South Bend Metal Working Lathe, adjustable horizontal motor drive, with 110 volt, 60 cycle single phase alternating current motor, with reversing switch and belting | \$158.00 |
| 1—Chuck and Tool Assortment for above lathe..... | 40.00 |
| 1—12" Bench Motor Driven Sensitive Drill Press, or portable electric drill with stand..... | 35.00 |
| 1—6" Two-wheel Bench Motor Driven Emery Grinder (motor separate)..... | 15.00 |
| 1—Hand Power Forge and Anvil..... | 40.00 |

Estimated Cost of Hand Tool and Accessory Equipment

| | |
|--|-----------------|
| Material for Work Benches, Storage Cabinets, Drawing Table and Tool Cabinets to be made in the shop—approximate total cost, including vises..... | \$ 70.00 |
| Hand Tools for Metal Working..... | 50.00 |
| Hand Tools for Woodworking..... | 135.00 |
| Soldering Equipment and Tools..... | 12.00 |
| Plumbing Equipment and Tools..... | 15.00 |
| Tools and Wrenches for Tractor and Gasoline Engine Work..... | 25.00 |
| Harness Repair Equipment..... | 25.00 |
| Tools for Concrete Work..... | 5.00 |
| General Shop Supplies..... | 50.00 |
| Total Cost of Entire Equipment for Farm Mechanics Shop No. 1..... | \$675.00 |

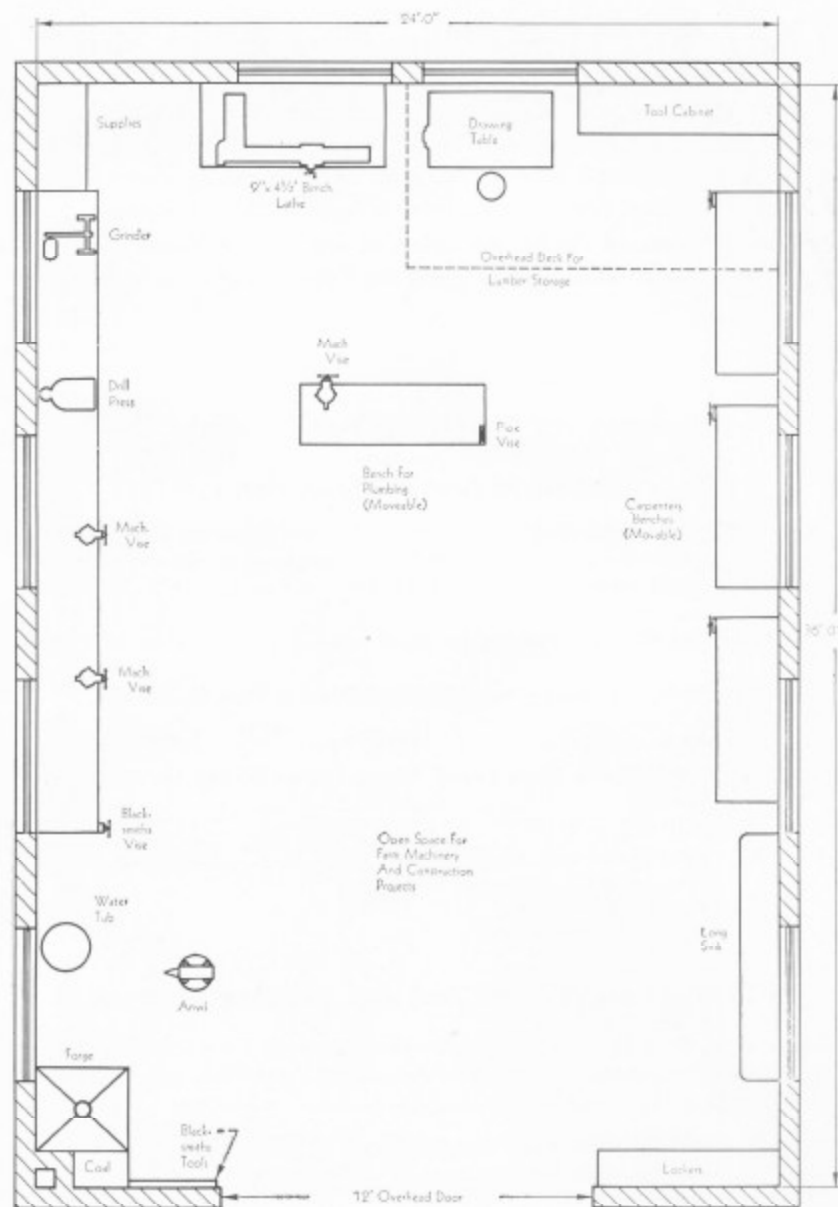


Fig. 43. Floor Plan of Farm Mechanics Shop No. 1, Size 24' x 36' for Ten to Fifteen Boys Each Period.

Floor Plan of Farm Mechanics Shop No. 1

For 10 to 15 Boys—Approximate Cost of Equipment \$675.00

The floor plan above shows the arrangement of Farm Mechanics Shop Equipment No. 1 in a shop room 24 ft. x 36 ft. Benches are placed along the wall, leaving an open space in the center for large farm machinery or projects. The 12-ft. wide door permits bringing almost any type of farm machine into the shop.

Farm Mechanics Shop Equipment No. 2

The floor plan on page 23 shows the arrangement of equipment in a practical farm mechanics shop for a class of 15 to 20 boys each period. This shop is 30 ft. x 50 ft., with an overhead door 12 ft. wide and a working space in the center large enough for several farm implements to be taken into the shop.

The estimated cost of the major items of equipment, small hand tools and accessories for the various classes of work are listed below.

Equipment for Farm Mechanics Shop No. 2

Estimated Cost of Major Items

| | |
|--|----------|
| 1—13"x6' South Bend Quick Change Gear Metal Working Lathe, pedestal motor drive, with 110 volt, 60 cycle single phase alternating current motor, reversing switch and belting..... | \$676.00 |
| 1—Chuck and Tool Assortment for above lathe..... | 80.00 |
| 1—12" Bench Motor Driven Sensitive Drill Press or Portable Electric Drill with Stand..... | 35.00 |
| 1—6" Two-wheel Heavy Duty Bench Motor Driven Emery Grinder (motor separate)..... | 35.00 |
| 1—Hand Power Forge and Anvil..... | 40.00 |

Estimated Cost of Hand Tool and Accessory Equipment

| | |
|--|------------------|
| Material for Work Benches, Storage Cabinets, Drawing Table and Tool Cabinets to be made in the shop—Approximate Total Cost, including Vises..... | 87.50 |
| Hand Tools for Metal Working, Wrenches, etc..... | 62.50 |
| Hand Tools for Woodworking..... | 170.00 |
| Soldering Equipment and Tools..... | 15.00 |
| Plumbing Equipment and Tools..... | 20.00 |
| Tools and Wrenches for Tractor and Gasoline Engine Work..... | 30.00 |
| Harness Repair Equipment..... | 30.00 |
| Tools for Concrete Work..... | 5.00 |
| General Shop Supplies..... | 65.00 |
| Total Cost of Entire Equipment for Farm Mechanics Shop No. 2 | \$1351.00 |

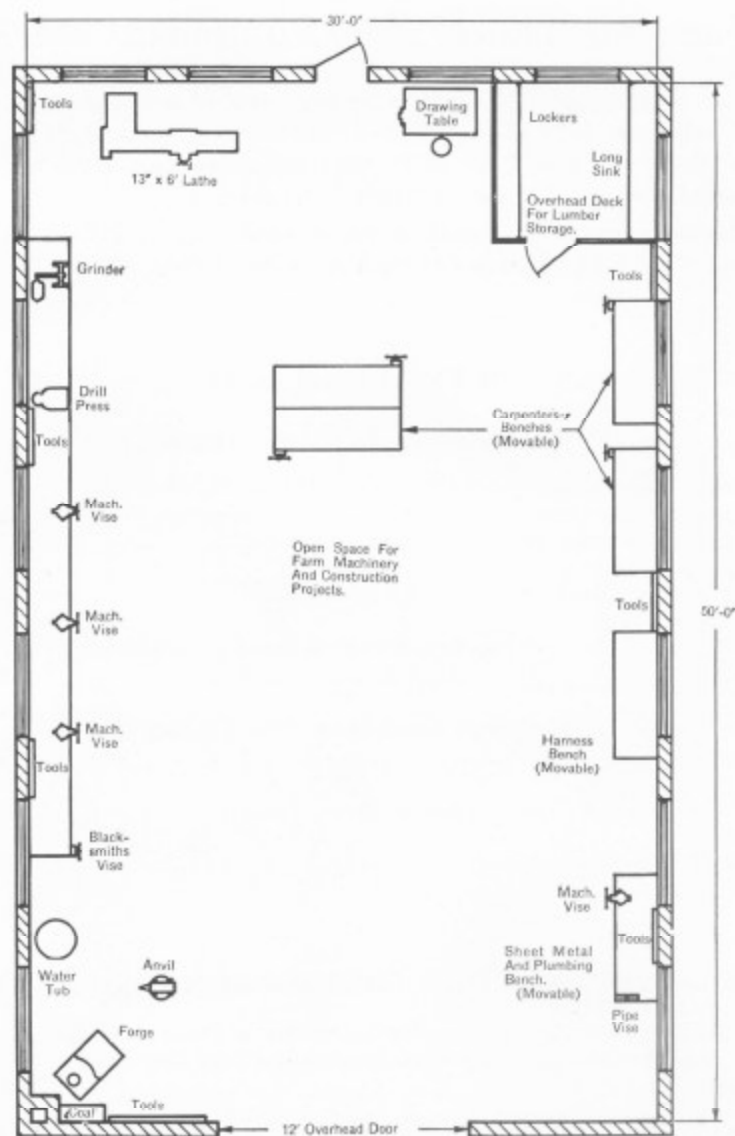


Fig. 44. Floor Plan of Farm Mechanics Shop No. 2, Size 30' x 50', for Fifteen to Twenty Boys Each Period.

Floor Plan of Farm Mechanics Shop No. 2

For 15 to 20 Boys—Approximate Cost of Equipment \$1351.00

The floor plan above shows the arrangement of Farm Mechanics Shop Equipment No. 2 in a shop room 30 ft. x 50 ft. Benches are placed along the wall, leaving an open space in the center for large farm machinery or projects. The 12-ft. wide door permits bringing almost any type of farm machine into the shop.

Farm Mechanics Shop Equipment No. 3

The floor plan on page 25 shows the arrangement of equipment in a practical farm mechanics shop for a class of 18 to 25 boys each period. This shop is 30 ft. x 60 ft., with an overhead door 12 ft. wide and a working space in the center large enough for several farm implements to be taken into the shop.

The estimated cost of the major items of equipment, small hand tools and accessories for the various classes of work are listed below.

Equipment for Farm Mechanics Shop No. 3

Estimated Cost of Major Items

| | |
|--|-----------|
| 1—16"x8' South Bend Quick Change Gear Metal Working Lathe, pedestal motor drive, with 110 volt, 60 cycle single phase alternating current motor, reversing switch and belting..... | \$ 919.00 |
| 1—Chuck and Tool Assortment for above Lathe..... | 100.00 |
| 1—12" Bench Motor Driven Sensitive Drill Press or Portable Electric Drill with Stand..... | 35.00 |
| 2—6" Two-wheel Heavy Duty Bench Motor Driven Emery Grinders. (motors separate)..... | 70.00 |
| 2—Hand Power Forges and Anvils..... | 75.00 |
| 1—8" Variety Saw (optional)..... | 80.00 |

Estimated Cost of Hand Tool and Accessory Equipment

| | |
|---|-------------------|
| Material for Work Benches, Drawing Board, Storage Racks and Tool Cabinets to be made in the shop—Approximate Total Cost, including Vises..... | 140.00 |
| Hand Tools for Metal Working, Wrenches, etc..... | 100.00 |
| Hand Tools for Woodworking..... | 250.00 |
| Soldering Equipment and Tools..... | 25.00 |
| Plumbing Equipment and Tools..... | 25.00 |
| Tools and Wrenches for Tractor and Gasoline Engine Work..... | 50.00 |
| Harness Repair Equipment..... | 30.00 |
| Tools for Concrete Work..... | 10.00 |
| General Shop Supplies..... | 100.00 |
| Total Cost of Entire Equipment for Farm Mechanics Shop No. 3 | \$2,009.00 |

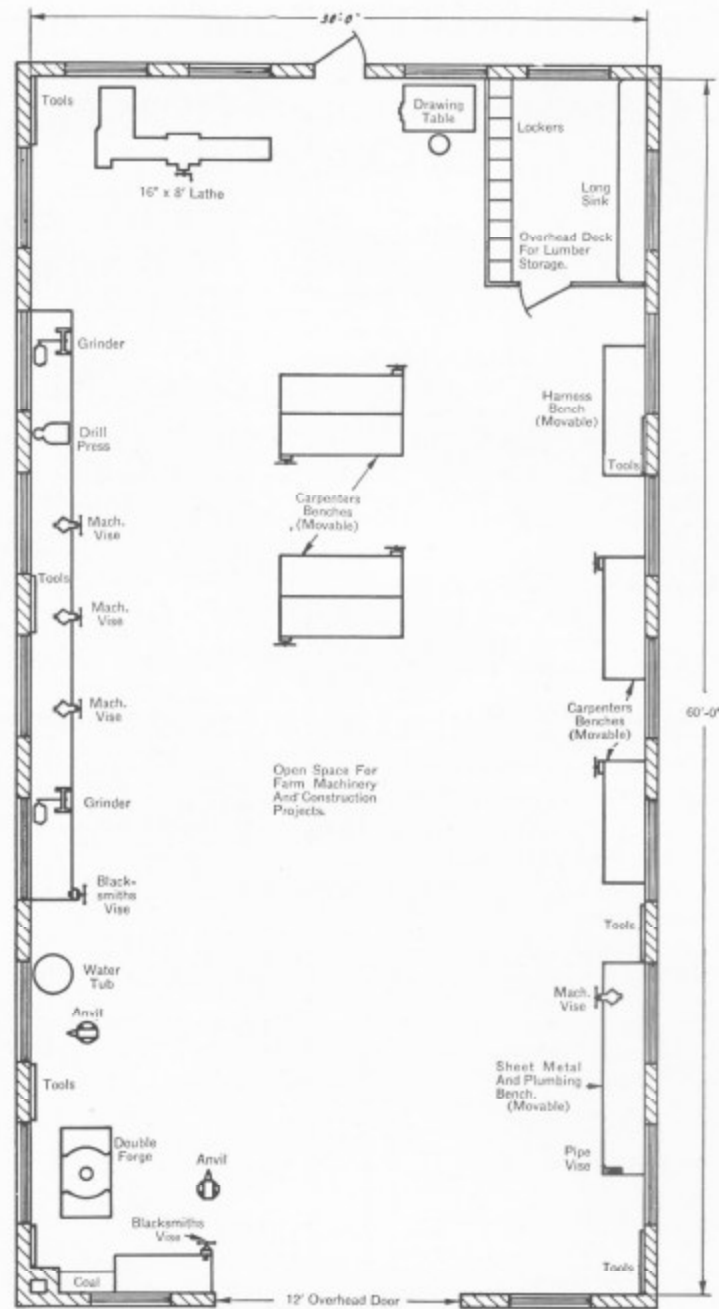


Fig. 45. Floor Plan of Farm Mechanics Shop No. 3, Size 30' x 60', for Eighteen to Twenty Five Boys Each Period.

Floor Plan of Farm Mechanics Shop No. 3 For 18 to 25 Boys—Approximate Cost of Equipment \$2009.00

The floor plan above shows the arrangement of Farm Mechanics Shop Equipment No. 3 in a shop room 30 ft. x 60 ft. This shop is similar to those on pages 21 and 23, except that it is larger.

The South Bend Machine Shop Course

For Instruction in Lathe Work

The South Bend Machine Shop Course consists of a series of drawings and instruction sheets for twelve practical projects, bound in a 32-page book, size 8½" x 11".

Each project drawing shows all dimensions clearly. The job instruction sheets guide the student step by step through the various operations for each project.

The book, "How to Run a Lathe," described on the opposite page, should be used as a text book and reference in conjunction with the South Bend Machine Shop Course project book. Complete instructions for performing the various lathe operations specified in the project book are given in the book, "How to Run a Lathe."

Shop instructors find the South Bend Machine Shop Course project book very practical and convenient. The book is inexpensive and its use will greatly simplify the work of the instructor.

The price of the book "South Bend Machine Shop Course" is 50c per copy postpaid. Coin or stamps of any country accepted.

A sample copy of this valuable book will be mailed on request postpaid, no charge, with our compliments to any school shop instructor, principal or supervisor.

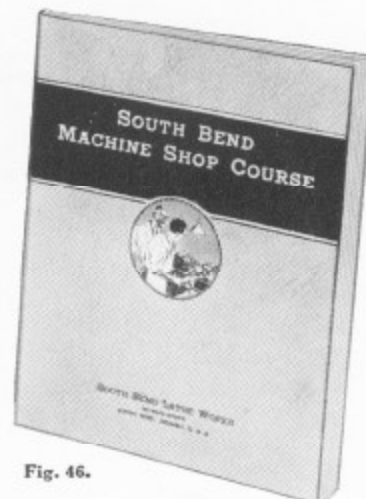


Fig. 46.

12 Projects in Machine Shop Course

Nail Set
Center Punch and Drift Punch
Plumb Bob
Tap Wrench
1-inch Bolt and Nut
60° Lathe Centers, Head and Tail
Machinists' Jack Screw
Small Bench Vise
Screw Driver, Steel
"C" Clamp
Machinist's Clamp
Machinist's Hammer Kit

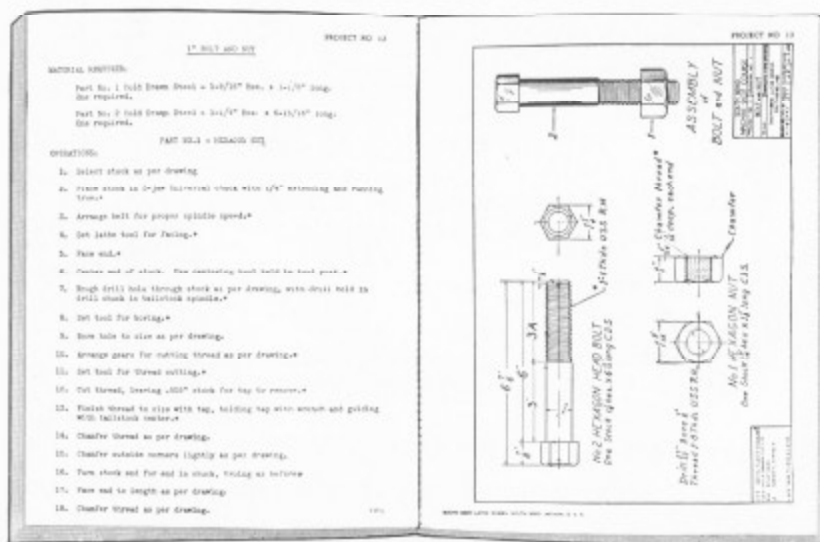


Fig. 47. Two pages from The South Bend Machine Shop Course Book.

How to Run a Lathe

A Valuable Text and Reference Book For the Farm Mechanics Shop

Competent authorities say that this is one of the most complete books ever written on the care and operation of a back-gear screw cutting lathe. It contains 128 pages size $5\frac{1}{8}'' \times 8''$ and has more than 360 illustrations.

The various types of operations involved in the use of the lathe on all kinds of machine work are clearly explained and illustrated. This book is recommended as a text and reference book for use in connection with farm mechanics shop work.

Large industries, such as the Ford Motor Company, Bethlehem Steel Company, New York Central Railroad Company, etc., use "How to Run a Lathe" for apprentice shop training. Schools and colleges all over the world accept it as a standard text and reference book on machine shop practice. Over 1,500,000 copies have been published in the last 30 years, and the book is now in its 34th revised edition.

The price of the book "How to Run a Lathe" is 25c per copy, postage paid, coin or stamps of any country accepted.

A sample copy of this valuable book will be mailed on request, postage paid, no charge, with our compliments, to any school shop instructor, supervisor, principal or superintendent.

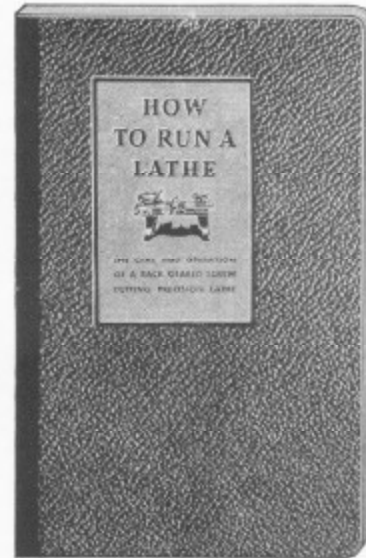


Fig. 48. "How to Run a Lathe." Price 25c per copy, postage paid, coin or stamps of any country accepted.

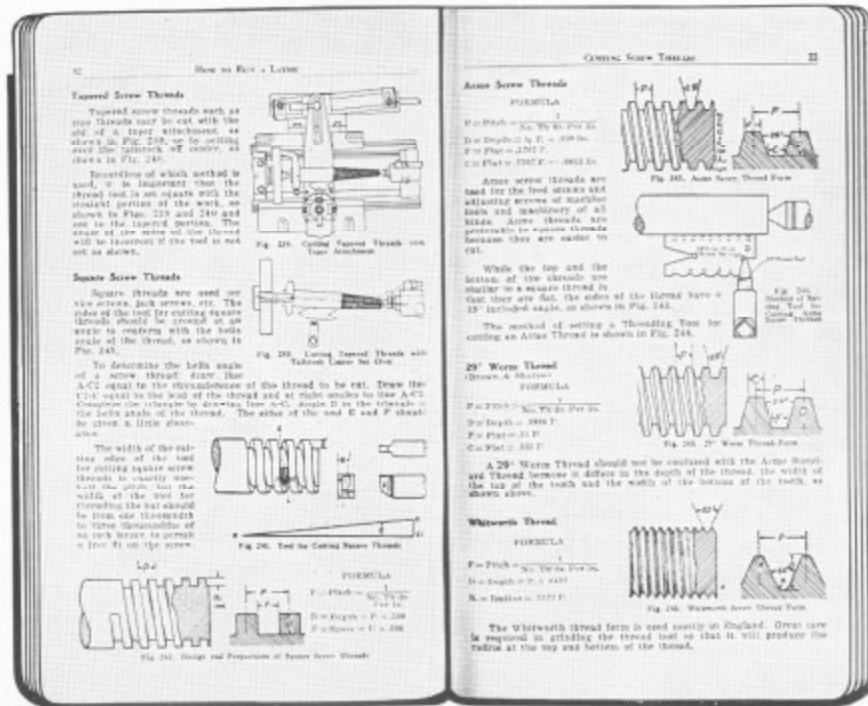


Fig. 49. Two sample pages from the book "How to Run a Lathe."

Reference Books on Farm Mechanics

The books and bulletins listed below have been recommended by leading educators as practical reference material for the farm mechanics shop. The information given in these books and bulletins will be found helpful in selecting the equipment for the shop, planning and organizing the shop, and outlining a course in farm mechanics.

Reference Books on Farm Shop Work

- "Fitting Farm Tools," L. M. Roehl, The Bruce Publishing Co., Milwaukee, Wis.
- "Farm Machinery," A. A. Stone, John Wiley and Sons, Inc., New York, N. Y.
- "Farmers Shop Book," L. M. Roehl, The Bruce Publishing Co., Milwaukee, Wis.
- "Operation, Care and Repair of Farm Machinery," John Deere & Co., Moline, Ill.
- "Farm Tractors," A. A. Stone, John Wiley and Sons, Inc., New York, N. Y.
- "Electricity in the Home and on the Farm," F. B. Wright, John Wiley and Sons, Inc., New York, N. Y.
- "Mechanical Training," Boss, Dent, and White, The Bruce Publishing Co., St. Paul, Minnesota.
- "Farm Engineering," B. B. Robb and F. G. Behrends, John Wiley & Sons, New York, N. Y.
- "Farm Mechanics Text and Hand Book," Cook, Scranton, McColby, Interstate Publishing Co., Danville, Ill.
- "Principles of Farm Mechanics," M. A. Sharp and W. M. Sharp, John Wiley & Sons, Inc., New York, N. Y.

Experiment Station Circulars and Bulletins

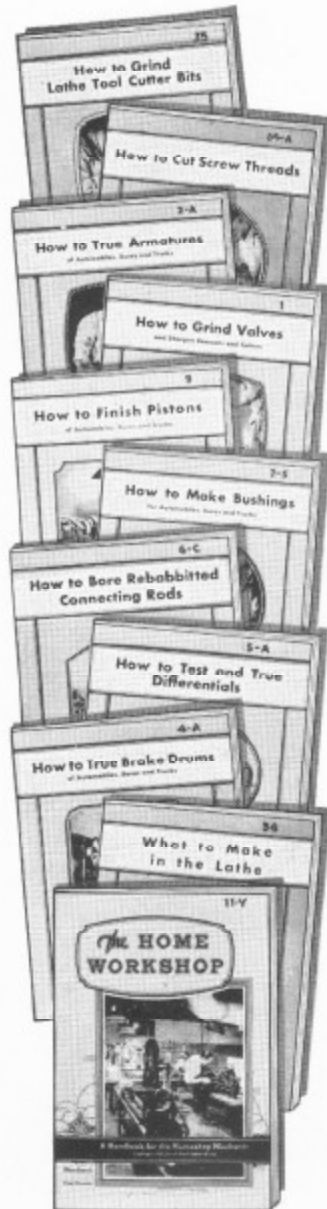
- "Fitting the Farm Saws," Bulletin 94, L. M. Roehl, New York State College of Agriculture at Cornell University, Ithaca, N. Y.
- "Grinding Farm Tools," Bulletin 379, L. M. Roehl, New York State College of Agriculture at Cornell University, Ithaca, N. Y.
- "Water Supply and Plumbing for the Farm Home," Extension Bulletin No. 95, December 1934, Extension Service, College of Agriculture, Moscow, Idaho
- "Electric Equipment in the Home, Its Care and Repair," Bulletin 76, February 1936, University of Maryland, Extension Service, College Park, Maryland
- "Wiring the Farmstead," Extension Bulletin 72, Revised May 1932, Michigan State College, Extension Division, East Lansing, Mich.
- "Grinding Grain with Electric Power," Extension Bulletin 88, April 1930, Michigan State College, Extension Division, East Lansing, Mich.
- "Operation and Care of the Cream Separator," Circular 61, Revised December 1934, Agricultural Experiment Station, Moscow, Idaho
- "Tractor Repair and Maintenance," Circular 425, College of Agriculture, Urbana, Ill.
- "Hitches for Field Machinery," Bulletin 297, December 1935, Agricultural Experiment Station, Brookings, S. D.
- "Comparative Study of Pneumatic Tires and Steel Wheels on Farm Tractors," Bulletin 291, September 1934, Agricultural Experiment Station, Lincoln, Nebr.
- "Care and Repair of the Mowing Machine," Extension Circular 153, December 1935, Michigan State College, Extension Division, East Lansing, Mich.
- "Better Concrete on the Farm," Circular 255, July 1930, College of Agriculture, Extension Service, Columbia, Mo.
- "Binder and Knotter Head Troubles," Bulletin No. 87, Agricultural Extension Service of the Ohio State University, Columbus, Ohio

Reference Material Available from Manufacturers

- "How to Run a Lathe," South Bend Lathe Works, South Bend, Ind.
- "How to Grind Tool Cutter Bits," South Bend Lathe Works, South Bend, Ind.
- "How to Cut Screw Threads," South Bend Lathe Works, South Bend, Ind.
- "The Farm Workshop and Woodland," E. C. Atkins & Co., Indianapolis, Ind.
- "The 'How-To-Do-It' Book for Home Workshop," E. C. Atkins & Co., Indianapolis, Ind.
- "Handbook for Drillers" (48 pages), Cleveland Twist Drill Co., Cleveland, Ohio
- "Advice on How to Sharpen Woodworking Tools," The Carborundum Co., Niagara Falls, N. Y.
- "Permanent Farm Construction" (71 pages), Portland Cement Association, 33 West Grand Ave., Chicago, Ill.
- "A Textbook on the Lubrication of Internal Combustion Engines and Tractors," Standard Oil Co. (Indiana), Chicago, Ill.
- "Farm Tractor Fuels and Lubricants," Technical Department of Standard Oil Co. (Indiana), Chicago, Illinois.

Reference Books on Lathe Work

The bulletins listed below illustrate and describe how to handle general lathe work and seven major auto service jobs according to the latest shop practice followed in successful shops and plants in the United States. Thousands of mechanics use these bulletins in their work. Bulletins are 6" x 9" in size and contain from 8 to 28 pages each. When ordering specify the titles of the bulletins wanted and they will be mailed postpaid on receipt of price indicated. Coin or stamps of any country accepted.



Send for Some of These Valuable Instruction Books

"How to Grind Lathe Tool Cutter Bits" Bulletin No. 35. Explains in detail how to sharpen various types of cutter bits for lathe work. 16 pages, size 6"x9", 50 illustrations. Price postpaid10c

"How to Cut Screw Threads" Bulletin No. 36-A. Explains various screw thread forms and how to cut screw threads in the lathe. 24 pages, size 6"x9", 65 illustrations. Price postpaid, .10c

"How to True Armature Commutators and Undercut Mica" Bulletin No. 2-A. (Automotive.) Contains information on truing armature commutators and undercutting mica in the lathe. 12 pages, size 6"x9", 35 illustrations. Price postpaid.....10c

"How to Grind Valves and Sharpen Reamers" Bulletin No. 1. (Automotive.) Contains information on refacing automobile engine valves, sharpening valve seat reamers, cutters, etc. 12 pages, size 6"x9", 23 illustrations. Price postpaid.....10c

"How to Finish Pistons" Bulletin No. 9. (Automotive.) Contains detailed information on finishing semi-machined pistons in the lathe, reaming and honing wrist pin holes, etc. 12 pages, size 6"x9", 31 illustrations. Price postpaid.....10c

"How to Make Bushings" Bulletin No. 7-S. Contains information on making bushings, lathe mandrels, press fits and running fits. 12 pages, size 6"x9", 28 illustrations. Price postpaid...10c

"How to Bore Rebabbed Connecting Rods" Bulletin No. 6-C. (Automotive.) Illustrates and describes the latest shop practice for boring, facing, and finishing rebabbed connecting rods. 8 pages, size 6"x9", 25 illustrations. Price postpaid.....10c

"How to Test and True Differentials" Bulletin No. 5-A. (Automotive.) Contains information on removing the old ring gear, testing and truing the ring gear seat, testing hearings of drive pinions, etc. 8 pages, size 6"x9", 20 illustrations. Price postpaid10c

"How to True Brake Drums" Bulletin No. 4-A. (Automotive.) Shows how to mount various types of brake drums in the lathe for truing the drum so that it will be concentric, round and true. 16 pages, size 6"x9", 40 illustrations. Price postpaid.....10c

"What to Make in the Lathe" Bulletin No. 34. Illustrates and describes over 65 useful projects for the home and shop including tools, grinders, and other useful objects, also various models such as steam and gas engines, locomotives, airplanes, etc. 28 pages, size 6"x9", 75 illustrations. Price postpaid.....10c

"The Home Workshop" Handbook No. 11-Y. Shows a number of illustrations of excellent home workshops, hobby shops, etc. Also contains many good shop kinks, rules and tables, etc. 24 pages, size 6"x9", 70 illustrations. Mailed postpaid, no charge.

Consult Your State University

The Agricultural Engineering Department of your State University may have some valuable bulletins or other information that will help you in establishing a Farm Mechanics Shop. Your State Department of Vocational Education, County Superintendent and your County Agent will also gladly cooperate in the planning and organizing of a course in Farm Mechanics for your school.

The School Shop

Mailed on Request to Any School Official

This 48-page book size 6" x 9" illustrates and describes various types of school shops, including the farm mechanics shop, small general shop, large general shop, motor mechanics shop, junior high school machine shop, and senior high school machine shop. Floor plans and equipment for each type of shop are shown.

A copy of this valuable book will be mailed on request, postpaid no charge, with our compliments to any school shop instructor, supervisor or principal.



"The School Shop"
No. 57 Booklet.

9-inch "Workshop" Lathe Catalog

Catalog No. 46 is devoted exclusively to the South Bend 9-inch "Workshop" Lathe. This catalog has 24 pages size 8½" x 11" and contains over 130 illustrations. The various types of 9-inch "Workshop" Precision Lathes are fully illustrated, described and priced. A complete line of lathe attachments, chucks and tools are also shown.

The 9-inch "Workshop" Lathe is one of our most popular models and is especially suitable for use in the small shop. This lathe is made in several bed lengths ranging from 3 feet to 4½ feet, providing 17 inches to 35 inches between centers. Several types of motor drive can be supplied, as well as countershaft drive.

Mailed to any address, **Free** on request, postage paid.



"Workshop" Lathe
Catalog No. 46

General Catalog of South Bend Lathes

Mailed to Any Address on Request

General Catalog No. 98 illustrates, describes and prices the entire line of South Bend Lathes, 9-inch swing to 24-inch swing, Standard Change Gear and Quick Change Gear types. A complete line of lathe attachments, chucks and tools are also shown.

Anyone who is interested in machinery and shop equipment should have a copy of this 72-page 8½" x 10½" catalog. A copy will be mailed on request anywhere in the world postpaid, no charge.



General Catalog No. 98.

South Bend Lathe Works—Lathe Builders for 33 Years
553 Niles Ave., - - - South Bend, Ind., U.S.A.