

## Mechanical Equipment of the Farm

*Latest developments in agricultural machinery and practical suggestions for the farmer*

By HARRY C. RAMSOWER, Professor of Agricultural Engineering, Ohio State University

## Hot and Cold Water in the Farm Kitchen

ANYONE who has even a passing familiarity with the development of the American farm and farmstead knows it to be a fact that the equipment of the barns and the fields has been carried to a point far in advance of the equipment of the farm home. For forty years and more educational institutions, experiment stations, the farm press, all agencies in fact, interested in better farms and better farming, have emphasized the necessity of more fertile soils, better crops, better livestock, more and better machinery. It is well that such should have been the case. But have we not reached that stage in the development of the farm home where more attention should be given to the installation of such equipment as shall make for convenience where convenience has been shamefully neglected?

Not the least of the improvements to which I refer is that of a convenient water supply system. We have been too long contented to carry the day's supply of water for household use from the cistern outside the house, from the well to the barn, or from the spring yonder at the foot of the hill, forgetting that with a small outlay of time and money we might make it possible to save those few minutes each day which aggregate hours each month. You may not be able to supply yourselves with a complete system of hot and cold water costing from \$250 to \$300. But let me describe a simple system that is quite within the reach of at least eighty per cent of the farm homes of America and which will mean so much to all members of the home, particularly the women. The details of this system were largely worked out by Prof. W. A. Etherton, formerly of Kansas Agricultural College.

It consists essentially of a kitchen sink, a pump, a range boiler, some device for heating the water in the boiler, and a few feet of pipe with the necessary valves and connections. The sink may be of the ordinary type, but the one shown in the accompanying photograph is very much to be preferred. It is a rolled-rim porcelain-lined sink with a back. The back makes it so much easier to keep the sink and surroundings clean and presentable that it is well worth the extra cost. When a sink is installed, let the housewife determine how high it should be placed. The average carpenter will place it 30 inches above the floor. It should generally be 34 inches high, so that one washing in it will not find it necessary to stoop.

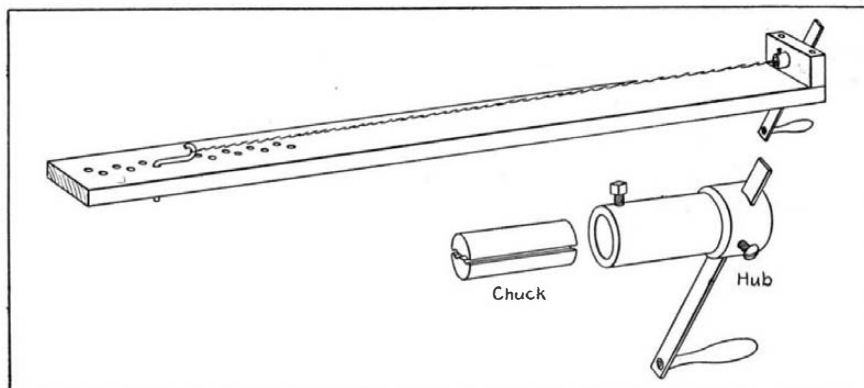
The pump is a kitchen-sink force-pump. The type shown has a brass cylinder. The air chamber is attached to the pump spout. The boiler feed-pipe leads from the pump to the range boiler, entering the boiler at the top and extending nearly to the bottom as shown by the transparency in the figure. At the point where this pipe connects to the pump spout there is placed a three-way valve with handle and pointer attached. The hot water pipe is taken from the top of the boiler and brought to the pump spout as shown. An air cock is placed in both the boiler feed pipe and the hot water pipe; in the former pipe it is placed in the horizontal line near the boiler, in the latter pipe it is placed in the vertical line near the pump.

The range boiler has a capacity of 30 gallons and is shown mounted on an adjustable stand. The bottom of the tank is placed on a level with the sink, to utilize the syphon principle to the fullest extent. The boiler may be placed at any convenient distance from the sink; in fact, it may be located in an adjacent room if desirable.

In the average farm home the water is most conveniently heated for at least nine months in the year by attaching the boiler to a "water-front" in the fire-box of the range. All companies manufacturing stoves make water-fronts which can be easily attached. A water-front may consist merely of a coil of one-inch pipe placed in the fire-box and attached by two leads of pipe to the boiler. Or it may be a simple rectangular iron box placed in the range. The former type provides a larger heating area, but burns out rather quickly if hard water with a large lime content is used.

A kerosene heater is being used in the equipment shown. This is an admirable substitute for the water-front during the hot summer months. The boiler connections to the water-front can be removed

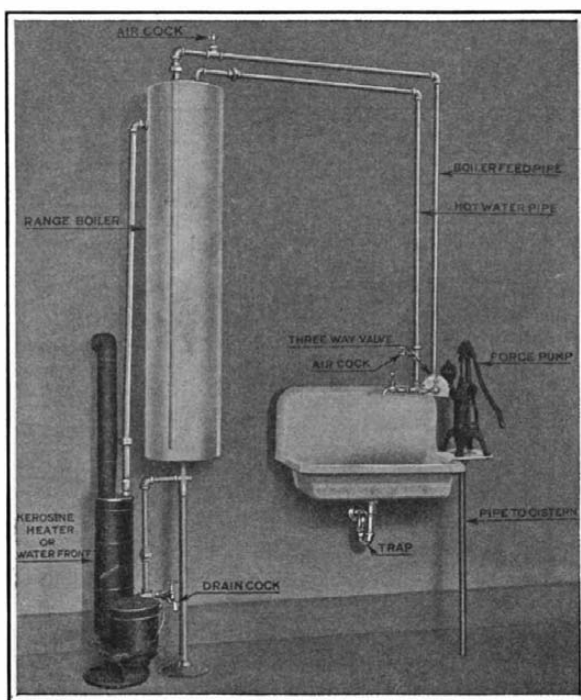
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### Home made device for twisting wires for concrete reinforcement

## Reinforcement for Concrete Posts

THE accumulation of old fencing wire about most every farm furnishes a source of cheap reinforcement for posts or other reinforced concrete, provided of course, that it is not rusted or tangled too badly. As ordinarily taken, this wire would be too crooked to be placed accurately in a post mold and would hardly be worth the time necessary to hammer it out straight. But, by a process of twisting, such wire as this can very easily be made into a straight, flexible and satisfactory reinforcement which serves very well in a concrete post. The twisting has not only the effect of straightening the wire, but it acts as a test on the wire in that weak places are liable to be broken in the twisting process, which may also

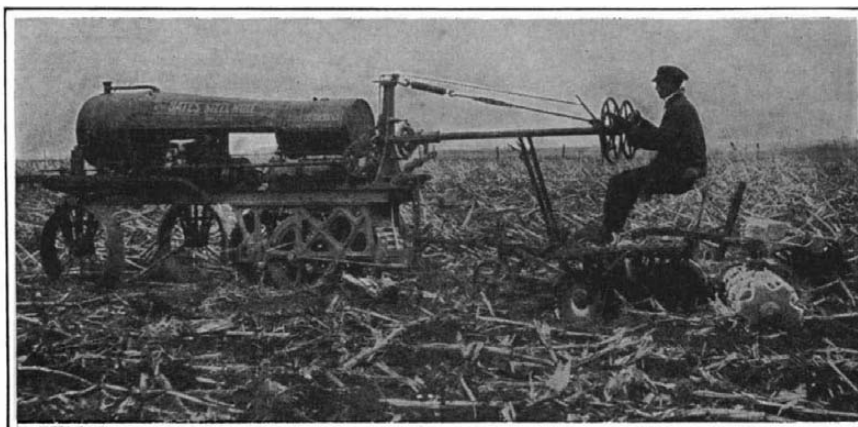


## Inexpensive hot water system for the farm

loosen some of the dirt and rust that might be adhering.

A simple homemade device for twisting wire into post reinforcements is shown in the accompanying illustration. The base for this device is a two by eight-inch plank about nine feet long. At one end is bolted a support for the crank which turns the chuck into which the wire is clamped. At the other end of the plank are a number of holes alternating on each side of the center and placed about an inch apart. Into these holes is dropped a sort of hook which holds the loop end of the wire.

To make a reinforcement for a seven-foot post, then, take 14 feet of No. 9 wire, clamp the two ends in the chuck, hook the loop of the wire with the special hook and place it into the hole that will pull it up the tightest.



## The steel mule at work

The slack and crookedness in the wire will then be taken out by the twisting which is done by turning the handle.

The chuck is perhaps the hardest part of the device to make. The writer made a chuck from a 2½-inch piece of 1½-inch steel shafting which was fitted into the handle and hub taken from a press drill. The set screw on the hub served both to hold the chuck and to clamp the wire. Two holes the size of the wire to be twisted were drilled into the end of the piece of shafting about two inches deep. Then with a hack saw the piece was split nearly to the other end. The ingenuity of the mechanic will be able to adapt this idea to any special case where the design illus-

illustrated cannot be followed.

The twisted reinforcement rod made from two strands of No. 9 steel wire will be found more satisfactory than the  $\frac{1}{4}$ -inch round rods that are often recommended, the writer believes. The twist in the wire permits of a better grip by the concrete and the twisted rod is also straighter and more flexible and is therefore more easily placed in the mold. There is also a saving of nearly a pound of steel to the post, where the wire is used. The two No. 9 wires furnish ample reinforcement for a square section post about four by four inches or four by five inches in size, where a reinforcement is placed in each corner. Probably the least reinforcement that could be used in such a post would be two No. 12 wires twisted together for each corner. Where old wire is used, that may be rusted, some allowance must be made for its lack of strength and perhaps four of the wires should be twisted instead of two.

## A Steel Mule That Drives Like a Horse

**By J. M. Bird**

THE only function that the horse performs in farm work is that of furnishing a means of pulling the machine along—that's the reason he is hitched up in front, where one can watch him and guide him while the implement is getting the ground or the crop into shape. Ordinarily, when auto-motive power is substituted for the horse, the power plant is mounted right on the machine with which it is intended to be used, since this seems by all means the natural and economical way. Why have two machines, one to work and one to pull, when one will suffice?

This question would be an unanswerable one indeed, if one machine would by any possibility suffice for all agricultural work. But unfortunately, it won't; the farmer has to have plows and harrows and cultivators and reapers and other apparatus; and if he were asked to buy a separate power plant with each it is very plain that mechanical farming wouldn't get very far. But even as things are, there is often objection to the purchase of a big tractor to haul the farm machinery about; for it takes at least one man to run the tractor and one to operate the trailer, as against a single man for most horse-drawn machinery of the types met on the small farm. Here is where the steel mule comes in.

This is just what its name implies—a draft horse of metal, that eats gasoline and kerosene instead of hay and oats. The steel mule simply goes where the horse goes—up in front of the trailer, where one can watch and guide it while the implement does the work. There is hardly an implement on the farm of today that cannot be hitched to and hauled by the steel mule; and it goes without saying that under ordinary circumstances, where the ability of the horse to govern better its instantaneous output of energy is not called on constantly, more work can be obtained out of the steel mule in a day than out of three span of big husky horses.

The control wheels are arranged so that the steel mule can be completely driven from the seat behind, just like a horse. The small wheel at the end of the column is used for shifting the transmission gears, a slight twist changing the speed to suit the work under way. The middle wheel is used for steering, which is of the irreversible worm and nut type. The steering arms are so designed that not only can the tractor turn in a space less than that required for five horses, but that the muscular effort involved in guiding this machine is far less than that used with any automobile made. The largest wheel serves two purposes; it disengages the clutch and locks it by means of a simple ratchet mechanism.

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### The Spad Pursuit Biplane

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however, that the surface of the radiator is none too great for the eight-cylinder motor driving the propeller through reduction gearing. There are two exhaust pipes—one for each bank of four cylinders. The length of the pipes deadens somewhat the sound of the exhaust—a very good point.

The large unbalanced rudder is hinged to the triangular fin and to the fuselage which terminates in a vertical knife edge. The elevators are hinged to the stabilizer almost a foot forward of the rear end of the fuselage, thus allowing a great working angle to the rudder. The stabilizer is supported by a tube from the fuselage on each side.

The landing chassis is very simple, consisting of two pairs of struts, each forming an inverted V. At the apex of each V is a slot guiding the axle up and backward parallel to the rear struts. Shock absorbers are of the rubber cord type. A short skid near the tail completes the landing gear.

Following is a table of characteristics: Span, 26 feet, 3 inches; length 20 feet, 4 inches; chord, 4 feet, 7 inches; gap, 4 feet, one inch; wing area, 220 square feet.

### Hot and Cold Water in the Farm Kitchen

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with a very little trouble and the stove attached. The stove will heat a tankful of cold water sufficiently hot for kitchen use in two or three hours. For ordinary use in the average kitchen the water may be kept hot for one-third of a cent per hour. On wash days or whenever an excessive amount of water is used more fuel will, of course, be required.

If cold water direct from the cistern is needed at the sink, it is only necessary to turn the three-way valve so that the pointer will be to the extreme right (the pointer is not found with the regular three-way valve, but is shown here for the sake of clear explanation).

If hot water is wanted at the sink (assuming that the boiler is full and properly heated), it is necessary merely to turn the three-way valve to the position with the pointer straight up, and pump. The cold water from the cistern is forced through the boiler feed pipe into the bottom of the boiler, forcing hot water out at the top of the boiler through the hot water pipe. If a gallon of cold water is pumped into the boiler a gallon of hot water will be delivered at the sink.

If hot water is wanted at the sink when it is not convenient to operate the pump, it is only necessary to turn the pointer of the three-way valve to the extreme left and open the air cock in the hot water pipe. The opening of this cock permits air to pass into the top of the boiler through the hot water pipe. Warm water from the bottom of the boiler will then flow through the feed pipe to the pump. The flow will continue until the water in the boiler is lowered to the level of the pump spout. As a rule one would seldom have occasion to draw water from the boiler in this way, since it would be necessary to pump a like amount of water into the boiler later. Further, in this method water is drawn from the bottom of the tank and consequently is not so hot as water at the top of the tank.

If it is desirable for any reason, as when leaving the house for several days in winter, to drain the boiler and pipes, it is necessary merely to turn the three-way valve to the extreme left and fasten the pump handle up, when the water will drain back into the cistern. The entire contents of boiler and pipes will drain out except that in the very lowest part of the boiler, which may be drained out through the drain-cock near the stove. Or, if it is desirable to drain only the pipes, this may be done by opening the air cock in the boiler feed pipe and lifting the pump handle as before.

In addition to the uses already mentioned this equipment can be used to supply a bath tub in an adjoining room or on the floor above, by attaching to the hot water pipe another pipe leading to the bath tub.

With the attachment made near the pump, the flow can be directed to the bath tub by proper valves.

This simple equipment is well within the reach of almost every farm home. The cost would be about as follows:

A "water-front" for a range costs about \$3.50. The kerosene heater shown costs \$15. Measured in terms of convenience, of steps saved, of satisfaction secured, the cost is negligible. Should a more complete water system be later installed all parts of this equipment could be used, so that nothing would be discarded.

### A Steel Mule That Drives Like A Horse

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So effective is this device that the tractor can be stopped more quickly than horses, making the machine very safe in stony ground.

In operation the broad surface on the ground acts to the steel mule as snowshoes to a man in deep snow. It distributes the weight of the machine over so large a surface that the mule treads upon the ground with a step lighter than that of a man, while a horse would have to have boards at least ten inches by twelve clamped to his feet to equal it in this respect. Then again, on account of the wide spacing of the front wheels, the mule can pass over ordinary obstructions with greater ease and safety than the average tractor. The arrangement of wheels and crawler gives the machine the very efficient three-point ground support, so that no rocking or frame distortion can occur from work on uneven ground or rough roads. The fact that three points determine a plane is a familiar enough principle, but there are many of our readers to whom it will never have occurred to apply it to transportation over rough ground.

### Nitrate for Farmers at Cost

AS a part of its program for stimulating agricultural production, the Federal Government announces through the Secretary of Agriculture the purchase of about 100,000 tons of nitrate of soda which will be sold to farmers at cost, farmers paying the freight charges from the port of arrival and the State fertilizer tag fee.

The nitrate probably will be used most largely by farmers in the Atlantic Coast States from Long Island to Florida, owing to the value of nitrates for such crops as truck, grain and cotton, and the greater cost of freight to Middle and Western States. The free-on-board price at ports will be \$75.50 a ton.

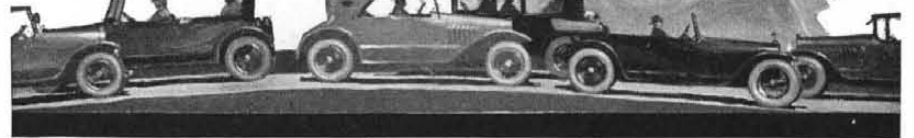
County agents and local committees are coöperating with the Department of Agriculture in the work of distributing the nitrate and will furnish farmers with application blanks and explanations of how to obtain the material. If the total of the applications exceeds the 100,000 tons available, the Government reserves the right to prorate the amount to individuals in smaller quantities.

None of the nitrate will be sold to dealers either directly or indirectly, according to the department, and each farmer in his application must agree not to resell any nitrate but to use it on his own farm. Applications must be signed and returned so as to reach the county agents or members of local committees by February 4th. The Government is making every effort to reach farmers who desire a part of this nitrate, but states that it will be impossible for the county agents or other persons to visit every individual farmer and urges all who desire to purchase nitrate to get in touch with their local county agent or a member of their local committee.

### Trade Marks in Great Britain

THE question as to the registrability of word trade marks has been occupying the attention of the British Courts to a considerable extent, and in the decisions which have been handed down, a line has been drawn between the case where a manufacturer has used a mark for the purpose of distinguishing his own goods from those of other manufacturers and a case where the manufacturer advertises the mark as the name of an article which anybody has the right to sell. In the latter case it has been held that the courts will

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