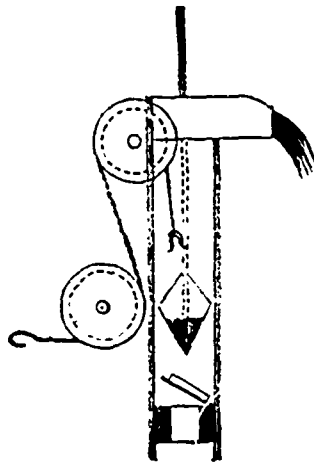


extending through the centre. Along this line an angular drain, (say about twelve inches wide and pointed at bottom similar to a hog trough), must be constructed, so arranged and protected that all drainage can fall into it, and be carried to a well or cistern sunk in the centre, capable of holding about two hundred barrels. This will require a cistern sixteen by sixteen feet, and six feet deep. This cistern must be made of pine, two inches thick, and hooped with four hoops of 2½ hoop iron, and constructed in the ordinary manner, with joists and plank floor to cover it. Any carpenter can make one, or indeed any one who can make a straight joint, and will make the attempt, after looking at one either in process of manufacture or when completed. I will, in a subsequent article, carefully describe the process of making a cistern, as nothing is more useful or more wanted on a farm than water cisterns, and the knowledge of how to make them is, in many situations, necessary to secure their advantages. I have myself often made them for my own use. The cistern, then, must first be constructed, and the bottom planks must be firmly spiked with abundance of spikes to strong pieces of six by six inch scantling, which cross the joints of the bottom on the outside, at each three feet distance; joists must also be placed across the top, and covered with planks. The cistern is then lowered into the hole dug to receive it, and clay puddle carefully rammed down all round it, so as completely to prevent any leakage between the sides and the earth. A half square or angular hole is now to be cut at the top on each side to receive the mouths or outlets of the drains delivering the drainage into the cistern. After wet weather, of course, rain will fall on the yard and run into the cistern as well, and as fast when there is no manure to leach, as when there is; this will, however, be of little consequence, and need not be any obstacle to the utility of the whole concern, as will be shown hereafter. We now come to the means of emptying this cistern, or liquid manure tank. An octagon pump is to be constructed of two inch plank, well jointed and spiked together. This is a very simple affair, and works much better than a square one. The inside must, of course, be planed smooth, and the eight pieces composing its sides all carefully gauged, and well and firmly spiked into one eight-sided trunk, about twelve inches in diameter.

When completed, there is at the lower end an octagon block, six inches deep, that just fits the barrel, with a six inch hole through it, on which is nailed an ordinary pump valve. This valve is composed of a piece of sole leather about eight by eight inches, and on which is nailed, with plenty of tacks, a piece of hard wood board, seven by seven inches, allowing one inch projection of the leather all round. Through one side of this projecting part the nails are to be driven that fasten this valve on to the block, which, when

placed in its proper position, and fastened by two small bolts, passing (one on each side of the hole) through the trunk, will now be ready for use. The trunk will be about fourteen feet long, and must be stepped into a small reservoir or half barrel let into and through the large trunk about the centre, and well nailed to the bottom and made tight with caulking. This forms a small supplemental tank below the main one, and its use is simply to step the pump into, and enable the cistern to be pumped quite out. It is not important otherwise to have any barrel so adapted, and the addition may be dispensed with if the cistern is not required to be emptied completely. It is important that the pump be well and carefully fastened by cleets to the bottom of the reservoir, and also in the part that comes in contact with the cover. The pump must be strong enough stayed to bear a horse to pull at it without shaking it.

Previously to the pump being securely fastened, do not omit providing an opening in one side of it, formed by cutting away about one-half of the lower end of the pump, below



the octagon block forming the lower valve, so as to allow at least three inches by eight for free access of liquid manure to flow in; otherwise, if the opening is too small, the pump will work very hard. The best way I could ever find to work such a pump is, to insert vertically into the top of the pump a cast iron shieve, about twelve inches in diameter by two inches thick, with a circular groove in it, to secure the chain used with a horse in raising the pump bucket or sucker. A second wheel is fastened against the centre of one side near the cover, about eighteen inches from it and outside the pump, and pieces or checks firmly screwed to the sides of the pump, and projecting far enough to allow of the revolution of the shieve, with a strong inch iron pin passing through it. The wheels, or shieves, must be provided with thin iron plates, projecting about two inches all round, or the groove must be correspondingly deep. This is to prevent the chain, by which the pump is worked, coming off the wheel on the return of the horse; the tackle

and pulley blocks used in ordinary horse hay forks will answer well enough as a makeshift. The accompanying diagram will sufficiently explain the arrangement. The straps which connect the leather of the valve to the rod should not be represented as attached to the edge of the leather, but from the inside, a little below the edge.

The pump sucker is made by taking a half circle of strong sole leather, cut as follows: take a straight edge and draw a straight line on the edge of the side of sole leather, of say twenty-four inches long, then get the compasses at twelve inches wide, and one point on the line, and describe half a circle, with the radius twelve inches. Cut out the half circular piece, and sew it firmly into the form of a cone, the circle forming the base, and the point at which the radius was struck the apex. Then cut a block of hard wood, six inches in diameter, and shape it so as exactly to fit the cone to about one-half its depth from the point; bore a 2½ inch hole through it, and nail the wooden cone firmly into the leather cone. Fasten to the edges of the cone eight small straps, about one inch wide and say twelve inches long, well riveted on the inside of the upper edge of the cone at equal distances, and attach them firmly by screws to the pump rod. This must be made of three by three inch oak or maple, and securely let into the block of wood that forms the centre of the cone, and firmly bolted there, as this rod has all the work to do, and must be very strong. The shaft or rod to be used must be about the length of the pump; less length would answer but for the need of having considerable weight to sink the bucket in its return stroke, (and at the same time to draw up the slack chain), as the horse backs up. A guide must be constructed, attached to the side of the pump near the top, with bolts, to form something to firmly stay the pump rod when on its upward stroke, and at the same time to allow the shaft, if well greased, readily to pass down again on its descent. We will now commence to pump. Take your horse and shorten up his traces so much that the whipple tree lies close to his hams, and above the hock joints; cover it with a piece of bagging to avoid chafing the skin, then take a small logging chain and Reeve it under the shieve, up the side of the pump and over the upper shieve, and hook the hook firmly to a large staple or eyebolt, inserted into the pump rod, near the cone. You will now push down the rod, or rather allow it to descend by its own weight, which must be great enough to cause it readily to do so; of course the liquid manure will at once gush up all round the leather cone, and when you move on the horse, you will draw the cone to the top of the pump, and with it about a four barrelfull of manure or more, according to the distance you allow the horse to walk. This will flow into the square head on the top of the pump prepared to receive it, and consequently into the shaft under which your manure convey-