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piece o by the amount of fall in 100 feet, and fasten the cross-piece at that point. For instance, if the fall is 14 inches in 100 feet cross-piece 100 must be nailed 14 inches higher up than cross-piece 0.

To do this we set up the home-made drainage level about half way between stakes 0 and 100, sight to both stakes, as shown by the dotted line in Fig. 18, and put marks on the two stakes. These marks are level with each other. We now measure the distance between cross-piece o and the mark. Let us suppose cross-piece o is 6 inches above the mark. Then cross-piece 100, to be 14 inches higher, must be 6 plus 14, or 20 inches, above the mark on it. If cross-piece o is below the mark, we subtract the distance from the grade or the grade from the distance to find how far cross-piece 100 must be above or below the mark, e.g.. if the grade is 14 inches in 100 feet and cross-piece o is 6 inches below the mark then cross-piece 100 must be 14 inches minus 6-8 inches above the mark, but if cross-piece o is 18 inches below the mark then cross-piece 100 m at be 18 minus 14=4 inches below the mark. For any other grade the cross-pieces are set in a similar manner. When they are thus placed, the cord which is tied stretched over them is 6 feet 6 inches above the ditch bottom and parallel to it.

But why have the overhead line 6 feet 6 inches above the bottom? Usually 6 feet is not enough to clear the man and his shovel; 7 feet would be more than is necessary, unless it is a very deep ditch.

To grade the second section of the ditch a cross-head must be set at stake 200. This may be roughly done by sighting it in line with crossheads 0 and 100, but it is always wise to set up the level and by means of it get cross-head 200 placed exactly the right amount above cross-head 100. The same applies to subsequent sections.

In practice it is found convenient not to tie the line to the cross-pieces, but to simply pass it over them and tie a fairly heavy stone to it. This keeps it always at the same tension and takes up any stretch that may occur. As a heavy line sags some on a 100 feet section, it is usually found best to interpose one or two light cross-heads between the end ones, by which they can be sighted in position. Instead of intermediate crossheads some use two light sticks, bolted together at the top like the letter A, with notches in one of them for the line, which may be raised or lowered either by the use of the notches or by closing or spreading the bottom of the sticks.

There are numerous devices for aiding in digging a ditch to the required grade, but the overhead line here described is, in our judgment, the best we have seen. We know men who have abandoned others in its favour, but none who have abandoned it for others.

LAYING THE TILE.

When the first section has been graded, and while the line is still strung, it is wise to lay the tile, so that they may be tested to grade by the same line, a notch being cut in the testing stick at a distance from