

GROUNDS.

One of the most essential parts of a lightning-rod system is the selecting of a good connection between the conductor and permanently moist earth. The term used is "grounding" the conductor. The ideal condition is reached when the "ground" extends far enough below the surface of the earth to reach a permanent water-level, but this condition is not often attained except in low places or where a stratum of clay or hard pan keeps the water near the surface. A metallic connection put down seven or eight feet below the surface of the earth would reach permanently damp soil. If a building were properly rodded, with the exception of the grounds, the lightning would pass down the conductor to the point nearest the surface of the earth and then jump the gap to damp earth, making a heavy spark at that point which might set fire to the barn. Then, too, there would be danger of the lightning not entirely following the conductor and thus damaging the building.

Every building should have at least two grounds. A good rule is to allow one ground for every two points used. If a third or centre ground is necessary, it should be fastened to the horizontal cable at the peak of the roof by means of a galvanized tee and set-screws, as shown in Figure 6.

The iron conductor can be run off the side of the building directly into the ground to damp earth. Here is where the durability of copper wire makes it of value. The iron cable will be eaten away in time, even with the galvanizing, the length of time depending on the character of the soil, and if put in the ground, should be watched to see when it is about to give out. If iron grounds are used, a good plan would be to put in three pieces of the same cable in the ground under the same conditions and at the end of five years take one out, and the other two at still later periods, to learn the condition of the other grounds. Copper cable will remain in the ground indefinitely, and is recommended for "grounds." If the copper cable cannot be readily bought, the ordinary wire can be purchased and twisted into a cable. Seven strands of No. 14 or No. 16 wire would be sufficient. The conductor can be brought down to the earth's surface and then be either twisted around the iron cable and held securely in place by winding with fine wire, or the two cables can be slipped past each other in a piece of pipe having set screws as shown in Figure 6. After these set-screws are screwed down tightly, the joint may be made more perfect by filling the pipe with melted lead or babbitt metal. In case the cables are twisted together and wound, it would be well to have the joint protected by putting it into a piece of 1 1/2-inch pipe about two feet long and letting the pipe rest loosely on the ground. The joint could be examined at any time by sliding up the pipe.