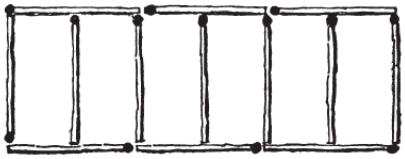
1.

THE SIX SHEEP-PENS.

Here is a puzzle with matches. It will be seen in the illustration that thirteen matches, representing a farmer's hurdles,

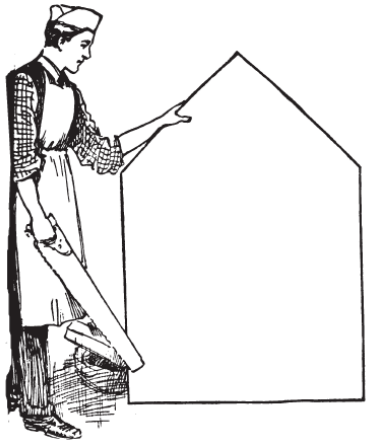


have been so placed that they enclose six sheep-pens all of the same size. Now, one of these hurdles was stolen, and the farmer wanted still to enclose six pens of equal size with the remaining twelve. How was he to do it? All the twelve matches must be fairly used, and there must be no duplicated matches or loose ends.

2.

THE JOINER'S PROBLEM.

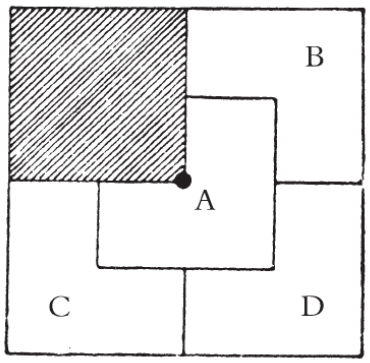
The joiner, in the illustration, wants to cut the piece of wood into as few pieces as possible to form a square table-top, without any waste of material. How should he go to work? How many pieces would you require?



3.

THE FOUR SONS.

A man possessed a square-shaped estate. He bequeathed to his widow the quarter of it that is shaded off. The remainder was to be divided equitably amongst his four sons, so that each should receive land of exactly the same area and exactly similar in shape. We are shown how this was done. In the centre of the estate was a well, indicated by the dark spot, and Benjamin, Charles, and David complained that the division was not 'equitable,' since Alfred had access to this well, while they could not reach it without trespassing on somebody else's land. The puzzle is to show how the estate is to be apportioned so that each son shall have land of the same shape and area, and each have access to the well without going off his own land.



1.

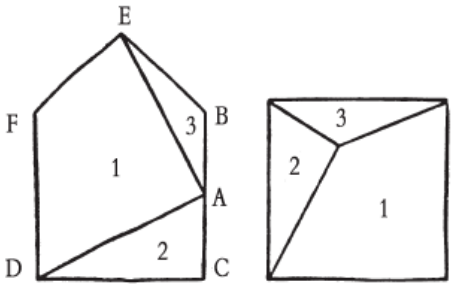
THE SIX SHEEP-PENS.

Place the twelve matches in the manner shown in the illustration, and you will have six pens of equal size.

2.

THE JOINER'S PROBLEM.

Nothing could be easier than the solution of this puzzle—when you know how to do it. And yet it is apt to perplex the novice a good deal if he wants to do it in the fewest possible pieces—three. All you have to do is to find the point A, midway between B and C, and then cut from A to D and from A to E. The three pieces then form a square in the manner shown. Of course, the proportions of the original figure must be correct; thus the triangle BEF is just a quarter of the square BCDF. Draw lines from B to D and from C to F and this will be clear.



3.

THE FOUR SONS.

The diagram shows the most equitable division of the land possible, "so that each son shall receive land of exactly the same area and exactly similar in shape," and so that each shall have access to the well in the centre without trespass on another's land. The conditions do not require that each son's land shall be in one piece, but it is necessary that the two portions assigned to an individual should be kept apart, or two adjoining portions might be held to be one piece, in which case the condition as to shape would have to be broken. At present there is only one shape for each piece of land—half a square divided diagonally. And A, B, C, and D can each reach their land from the outside, and have each equal access to the well in the centre.