The Arch Never Sleeps
The Pinnacles

Narrator:
So the flying buttresses are there to carry the sideways force over the space below, but what are the additional towers, the pinnacles doing? You can see pinnacles on the Lady Chapel. The buttresses are right up against its walls because there are no side aisles and each buttress is crowned by a fairly sizeable pinnacle. Together they enabled the 14th century architects to create a very wide and flat stone vault.

Francis Evans:
Now here we've got something quite different but in many ways doing the same job as the flying buttress and you'll often see this on medieval buildings where you've got an arch but outside there are little pinnacles. Sometimes they are on the flying buttress, sometimes you'll actually find them on the south and north wall of the church, and they usually look very attractive. They add to the balance and beauty of the building but that's not why those pinnacles are there. What's actually happening is you've got the sideways thrust of that but the downward force of the weight.

Narrator:
What effect is the weight of the pinnacle having on the line of action of the thrust inside the arch? There's a sideways force arising from the arch at the left and this, together with the combined weight of the voussoir and its load, produces a reaction force. These three forces are in balance as you can see by the triangle of forces. Reducing the weight of the pinnacle changes the downward force and also the magnitude and direction of the reaction force. At this low weight the reaction force is close to the edge of the structure.

Francis Evans:
Now let's see what happens to that resolution of forces when one of them is removed.
(MODEL COLLAPSES)

Narrator:
Gauging the weight of pinnacles wasn't an exact science. A good example of this can be seen at the East End of Ely. Two pinnacles were designed to stand on either side of the roof her but since one is missing just the base of the pinnacle seems to have provided enough weight all along.